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From Lady's Bridge, Sheffield. Photo—R. Blakemore

THE JOURNAL OF THE
NATIONAL SMOKE ABATEMENT SOCIETY

VOL. IX
NO. 33

FEBRUARY
1938

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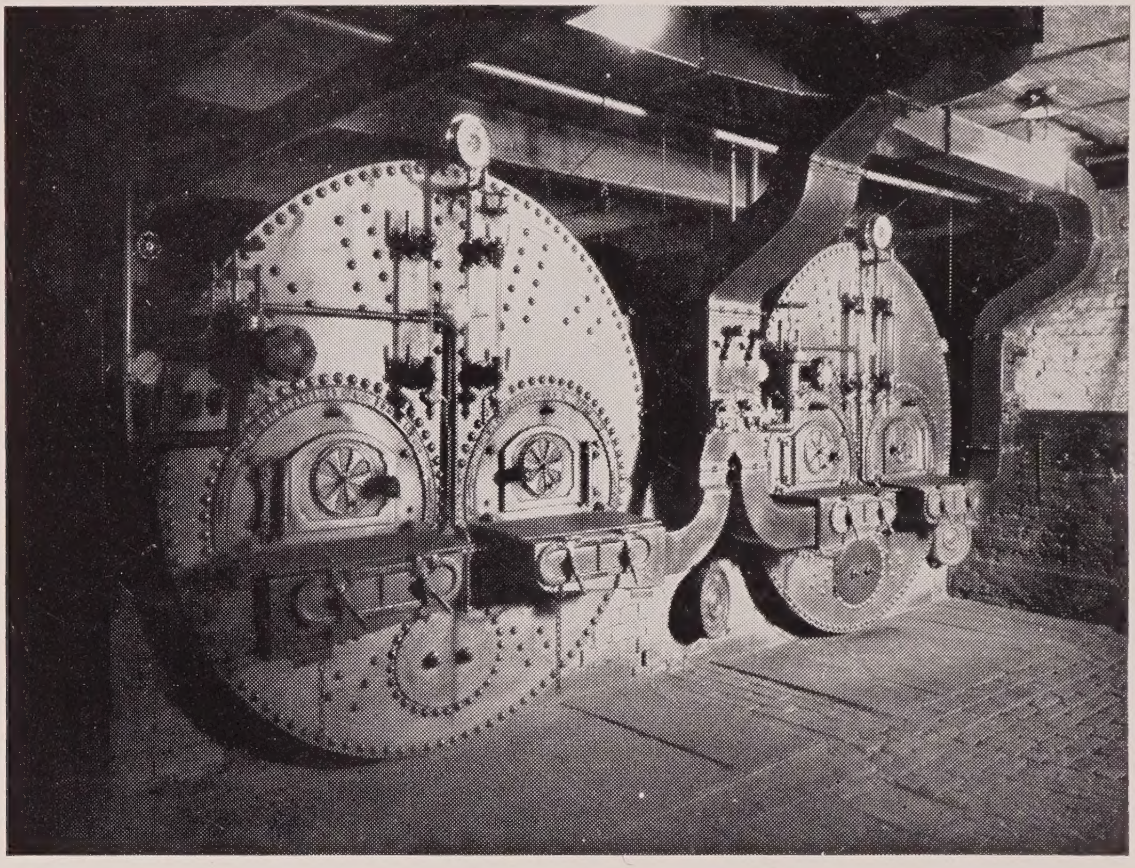

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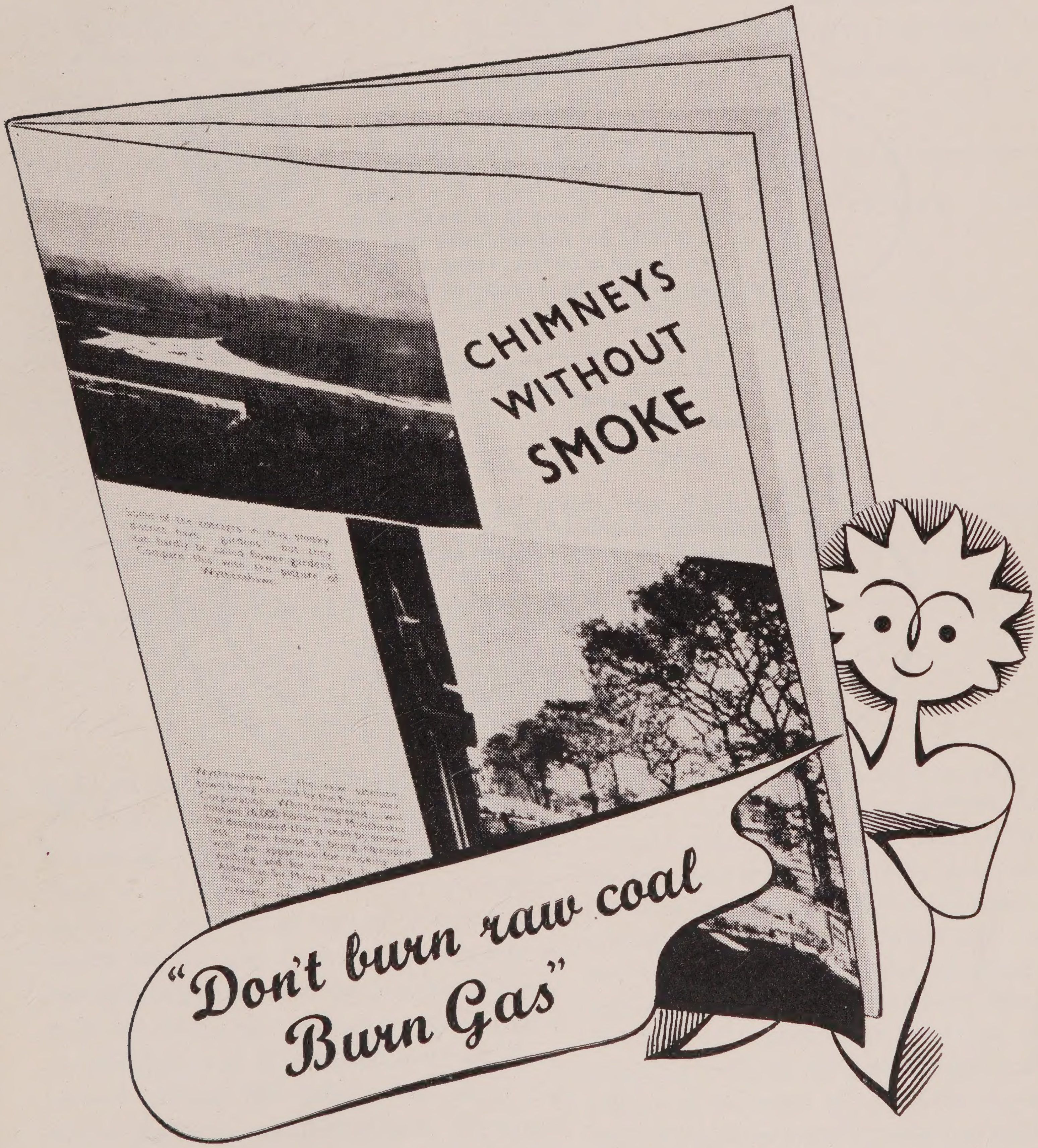
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The Journal of the National Smoke Abatement Society

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Vol. 9. No. 33.

February, 1938.

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The Journal is open for free discussion of all aspects of the smoke problem, and the opinions expressed in contributed articles are not necessarily the same as the views of the Society. Quotations and abstraction of matter appearing in the Journal is welcomed, provided the usual acknowledgements are made.

COMMENTARY

WE are glad to publish in this issue extracts of some length from Sir Philip Dawson's Presidential Address to the Institute of Fuel. From our point of view this comprehensive survey is of outstanding interest. Not only is it notable for the several outspoken references to atmospheric pollution and the need for its abatement, but the strong and reasoned demand for a co-ordination of all the fuel industries and for a planned national fuel policy, with which the address concludes, are developments that would be of fundamental value to the smoke abatement movement. It is outside the scope of these columns to discuss the primary purposes of Sir Philip's proposals, but their value to us can clearly be seen. The more our fuel problems are considered in a rational manner the easier will it be for smokelessness to be dealt with as one of the basic factors in questions of both the treatment and the uses of our coal resources. When every ounce of coal mined is used to the best advantage, from both the technical and the economic viewpoints, then there will be none wasted in the form of smoke. Then, too, perhaps, the thankless and unthanked labours of the miner will be better appreciated, and will not be so wantonly wasted, as the Samuel Commission pointed out, by pouring into the air each year the equivalent of three days work for a million men.

Sir Philip deserves our special thanks for the prominence he gave to our problem. It is more than encourgaing that he should have found it desirable to do this in an address that was concerned so broadly with the fundamentals of one of the most important problems of our national economic structure. Forty years ago such attention would have been incredible or would, if ventured upon, have been received with polite indifference. To-day, as we know, such statements are becoming more and more frequent, and are being listened to with increasingly thoughtful interest.

The *Journal* goes to press before Mr. Julian Huxley broadcasts the " Week's Good Cause " appeal on behalf of the Society, and it will not be possible to refer to its results until a later date. Nevertheless, whether the actual amount of money is large or small the appeal will have been an event of much interest and of great, though perhaps unknown, value in bringing the problem of smoke home to millions of listeners.

Another event of importance is the conference of Local and County Authorities which the Society has convened for 25th February. The purpose of this conference is to discuss what further steps can be taken to promote smoke abatement in Greater London, and the principal proposal will be for the setting up of a Regional Smoke Abatement Committee for Greater London. A Committee on these lines was formed in 1927, but it has long ceased to function, and there is now a growing need for a fresh start. The Conference has been approved by the Minister of Health, and has in other ways received support that gives rise to hope for its success. It will be preceded by a meeting of the Council of the Society.

Look out for a splash of unaccustomed colour on the cover of the next number. At least, we hope that the results of a Poster Competition now being held by the Society—on the lines of the photographic competition two years ago—will be good enough to warrant publication on the cover. Schools of Art and other quarters have been circularised, and it is hoped that there will be a good entry. The judges will be Sir Lawrence Chubb, and one of the best known of all poster artists, Mr. McKnight Kauffer.

We are pleased to be able to announce that Mr. W. R. Hornby Steer, M.A., LL.B., Recorder of South Molton, has accepted our invitation to become Standing Counsel to the Society. The position has been left unoccupied since the death of Mr. Randolph Glen. Mr. Hornby Steer has also agreed to undertake the preparation of a new addition of Mr. Glen's "Law Relating to Smoke and Noxious Fumes," which is now urgently required as a result of the many changes due to the Public Health and Public Health (London) Acts of 1936. The book will, in fact, be mostly re-written, and will be entitled " The Law of Smoke Nuisances." It will be sold at 1/- per copy, with paper covers, and with cloth binding at 2/- or 2/6.

It is well-known that the soot and tar inhaled continuously by town-dwellers remains in the lungs until death, even though many years may afterwards be spent in the unpolluted air of the country. The record for smoke deposit staying put seems to be securely held by an Egyptian musician named Harmose. A section of his lung recently exhibited under the microscope showed, entangled in the air cells, many particles of carbon and soot, indicating that he had lived in an atmosphere in which pollution was not unknown. The record lies in the fact that Harmose was a singer and flute player to Queen Hatsephsut, who lived about the time of the 18th Dynasty, 1580 to 1315 B.C. The soot is still there in spite of the 3,000 years that have elapsed since it was formed by some probably (by our low standards) comparatively inoffensive fire.

COAL: THE NEXT STEP

SIR PHILIP DAWSON'S PRESIDENTIAL ADDRESS

The recent Presidential Address to the Institute of Fuel, given by Sir Philip Dawson, M.P., is of more than usual importance and in many ways bears upon the ultimate solution of the smoke problem.

The Address is published in full in the October, 1937, issue of the Journal of the Institute of Fuel, and it is regretted that space does not permit the complete re-publication in these pages. In reading the following extracts, therefore, it should be borne in mind that certain sections are omitted, either wholly or in part.

After reviewing the present position of the Coal Industry, Sir Philip considers the Gas Industry, the Coking Industry, and the Iron and Steel Industry. Then follows a section headed and reading as follows :

Atmospheric Pollution.

The pollution of the atmosphere from the products of combustion still gives ground for grave concern, although progress in the gas and electrical industries has undoubtedly ameliorated the nuisance. Probably the great improvement in atmospheric conditions which has been effected during the last 30 years is due more to the use of gas, electricity and coke for both domestic and industrial appliances than to any other factor.

The open fire is still one of the most popular forms of domestic heating, and, according to the best authorities, is the cause of the bulk of atmospheric pollution in most towns. The development of smokeless solid fuels continues, but is slow ; and certain organizations are conducting experiments on burning raw coal smokelessly in the open fire.

On the industrial side, many boiler installations have been rendered unnecessary and abandoned, especially in the south of England, owing to the availability of electric current from the grid.

The concentration of electricity generating plants in various large power stations has in itself introduced new problems, of which one of the most important is the possibility of emitting large quantities of sulphur oxide from the chimneys, although, as far as visible smoke from tar vapours and dust is concerned, such chimneys usually give no trouble.

The question first arose in connection with the Battersea Station, and the matter was raised in the House of Commons. As a result the Electricity Commission were authorised to make conditions with regard to the maximum amount of sulphur permissible when sanctioning new power stations and extensions to existing ones.

The London Power Co. undertook very extensive and costly experimental work, first at the Grove Road station, and then at Battersea. In the method developed by them, the whole of the gases is washed with large quantities of water in the presence of iron, with the result that the bulk (over 90 per cent. of the sulphur dioxide present) are dissolved in the washing water in the form of sulphates and sulphites. The water itself requires further treatment in order to oxidize the sulphites before being returned to the river. The method has been so successful that the sulphur nuisance has been entirely eliminated, and the water returned to the river is in much better condition than when it left the river to effect the sulphur removal.

Slightly different methods have been developed in the case of Fulham, and the results achieved are probably equally satisfactory. Washing methods are, however, expensive ; and since the existing processes have been developed under stress, it is possible that, although it is not likely that more effective results would be achieved, other processes still to be developed might be more economic.

Both companies continue to improve their methods, but further experimental work should be undertaken, and it is hardly fair that the cost of this should be borne entirely by one or two individual companies.

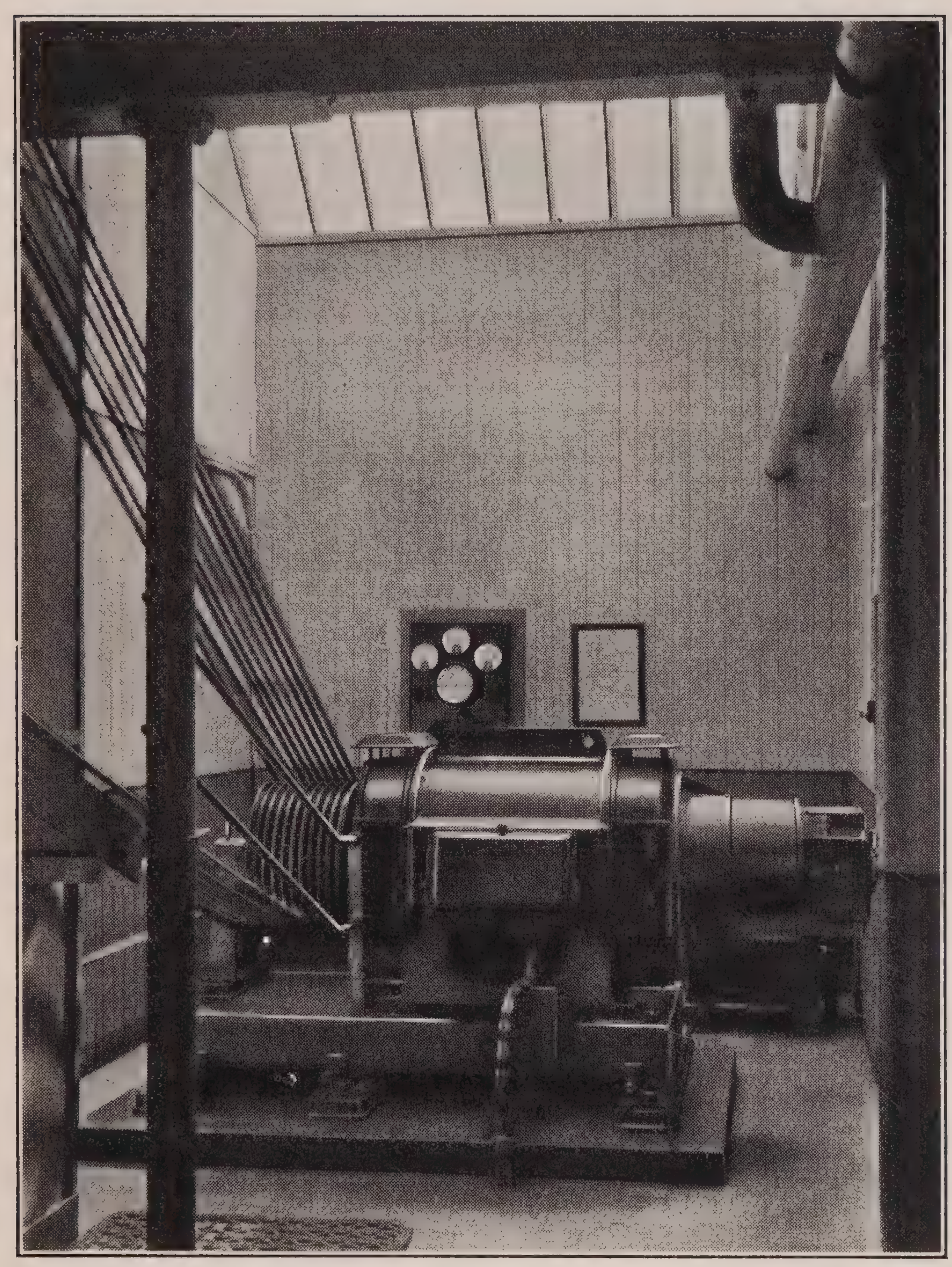
Further extracts from the address are as follows :

Low Temperature Carbonization.

The time of the Samuel Inquiry coincided with a wave of optimistic propaganda on the merits of low temperature carbonization as a universal panacea for the ills of the coal industry. The Commission, however, reported that " We can find no evidence that the system has yet been anywhere established on a commercial scale for a period sufficiently long to enable the claims that are made on its behalf to be fully tested." They pointed out that the difficulties were not insuperable technically, and they thought that " The evidence that we have taken has given us the impressions that we may be within measurable distance of a solution of both the technical and commercial problems that arise."

They also pointed out that one way in which the State could help these developments would be to offer an assured market for the coke and oils. As a result of this the Government became a customer for low temperature products as and when they became available. At the present time there are several plants in existence which are paying and others are in course of erection or contemplated.

SMOKELESS POWER



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The Commission envisaged a time when something more drastic could be done to encourage the use of smokeless fuel. Quoting from the Report : " Possibly if successful results were obtained on a large scale, the substitution of carbonized coal for raw coal would proceed with rapidity and without need of special stimulus. If it were found, however, that, through reluctance on the part of the public to modify old methods, the smoke-producing coal, although not appreciably cheaper than the other fuel, was used in considerable quantities, the Government and Parliament would doubtless consider whether its disuse could be accelerated. This might conceivably be done either by prohibition or by imposing a special tax upon a commodity, the continued use of which would be, in the circumstances supposed, unnecessary as well as to the public detriment. This, however, is dealing with a hypothetical case, and the antecedent conditions not yet having been realized, we abstain from making any definite recommendation."

Has not the time now arrived for re-opening the question ? The loss from damage due to smoke is enormous. If a householder lives on the banks of the Thames, he is heavily fined if he discharges to the river material even so innocuous as law cuttings, but at the same time he can discharge any amount of gaseous effluent to the atmosphere with impunity.

The Co-ordination of Coal-Using Industries.

In discussing the co-ordination of coal-using industries the Samuel Commission laid stress on the desirability of more consideration being given to this important question. They emphasize that " The question is not the co-ordination, as is often supposed, of two industries, coal and electricity, but of several—coal, electricity, gas, oil, chemical products, blast-furnaces, etc. Two or more methods dealing with two, three, or more of these may be used simultaneously in combination, one feeding the other.

" The point of importance is that no obstacles, whether of State regulation or industrial organization, should be placed in the way of the development of such combinations, in whatever manner engineering and chemical skill and the economic conditions might indicate as the most suitable. Sometimes a single commercial undertaking, divided into a number of departments, may conduct several of such industries, either in the same place or in different places ; sometimes there may be separate companies associated by permanent commercial agreements ; sometimes there may be separate companies dealing with one another only by way of ordinary contracts. It should be clearly recognized and constantly emphasized that the interests of the industries of mining, gasworks, electricity stations, coke and by-product undertakings and blast-furnaces, are closely interlocked, and it is to the obvious advantage of those who are engaged in them, whether employers or employed, that they should encourage whatever combinations are desirable in each particular case to promote their mutual prosperity."

The re-organization of large industries, such as iron and steel which has been such a prominent feature of the last decade, has undoubtedly resulted in their power and heat requirements being met in more economical ways ; but little co-ordination has taken place outside such industries. The gas and electricity supply undertakings still remain entirely independent one of the other. Although mutual discussion has taken place on common problems, there is still, in many cases, fierce economical rivalry, which cannot be to the eventual good of either. Such industries, whose only justification is service to the community, should be closely allied and organized in such a manner that the advantages of either might be developed to the utmost.

One of the advantages of the electric grid, upon which great stress was laid at its inception, and which was emphasized in the Samuel Report, was that such a network would be able to take advantage of cheap power which, at any place, was in excess of local requirements, and also that power might be obtained by a combination of electricity generation with heat generation, in those industries whose requirements are mainly large supplies of heat. Little progress has been made in this important matter, and this is probably due to the fact that no centralized organization has as yet made it its business to obtain the fundamental scientific and economic data upon which well-thought-out schemes could be based.

A National Supervisory Body.

In their recommendation for a National Supervisory Body the Commission emphasized that " no comprehensive survey has ever been made of the heat, light and power requirements of various industries, or of the country as a whole, and how they can be most economically met by the various processes at present commercially feasible : still less has the broad question been considered from the point of view of possible development in the future." They considered that in the national interest such a survey was imperatively required, but that it was not a matter on which a single *ad hoc* investigation would yield the most helpful results, and they thought this service should be undertaken by a body of a permanent character.

So far as electricity is concerned, the Electricity Commissioners have played a vital part in securing the effective treatment of its special problems, and it is fair to state that the enormous development that has taken place in the generation and use of electricity would have been impossible in the absence of such a body. How much more then is it desirable that commissioners of a similar type should be appointed to deal with the whole question of the utilization of fuel, whether in the raw state or in the forms of gas, coke, oil or electricity.

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Again, the anomalies of administration, even of the present central authorities, are apparent when we consider that the Electricity Commissioners come within the Ministry of Transport ; Gas Referees and the Gas Administration Department are under the Board of Trade ; research is under the Department of Scientific and Industrial Research, mines and some aspects of utilization are dealt with by the Mines Department ; Government purchases of coal, coke, and gas are mainly made by the Office of Works ; while the Admiralty, War Office and Air Ministry are responsible chiefly for the purchase of their own requirements of heavy and light liquid fuels ; and storage of liquid fuels for war comes within the purview of the Imperial Defence Committee.

The Samuel Commission recommended the appointment of a body of Coal Commissioners, to acquire and administer the mineral property. They also suggested the formation of a Standing Conference composed of the Chairmen and other representatives of the Electricity Commission, the National Gas Authority and the Coal Commission. There would also be included representatives of oil interests and of coking and by-products and the chemical industries. This body would exercise functions that would be advisory and not executive. Such a Committee, although not quite in the form suggested, was constituted with the title of "The National Fuel and Power Committee," to which reference is made in this address.

Coal Processing.

Coal being the British nation's greatest indigenous asset, steps should at once be taken to ensure the Government being in a position to direct to a great extent a national policy on coal utilization from the point of view of national economy. In other words, only certain coals should be used for certain purposes, thus eliminating a large amount of the present unnecessary waste ; for instance, the use of high-class coking coals for domestic purposes. This calls to mind the Survey of the Coalfields, which has now been under way for many years and should be speeded up. An analysis of this information should be made to explain its application to consumers' requirements. Only certain coals should be permitted for use and the utilization of these coals be limited to those economic purposes for which they are specially suitable.

The ever-present smoke nuisance calls for drastic attention. In spite of years of intermittent agitation, nothing is done officially on this question from the viewpoint of conservation of those coals which are responsible for the nuisance, and which comprise our most valuable asset. Laws applied to the industrial chimney, should, in some degree, be extended to the domestic chimney, as it would seem, after all that has been stated, that this will be the only method by which smokeless fuel will be burned in the domestic grate.

This, of course, can only be done in conjunction with the Government giving greater facilities for the production of the fuel required. This does not mean that the Government is called upon to erect carbonizing plants throughout the country, but to encourage the industry to supply the fuel itself. A step in this direction has been made by Government assistance in South Wales for the installation of low temperature plants, which will add to the already well-known supply of smokeless coals mined in that area and Scotland.

Linked up with plants built for carbonization of these coals should be central installations for treating the by-products. Based on the country's requirements of the chemical products obtainable, a comprehensive production plan should be worked out, so that a situation is not developed which would cause over-production of any one commodity and lead to depressed markets, such as have existed for years in the pitch industry. Utilization of by-products should be considered in conjunction with the production of motor fuels by such processes as hydrogenation and liquid fuel synthesis from coal.

These are objectives to aim at ; but it is realized, of course, that such schemes will have to come gradually. They will, however, never come unless a definite programme is established with the firm intention of achieving these aims at the earliest possible time.

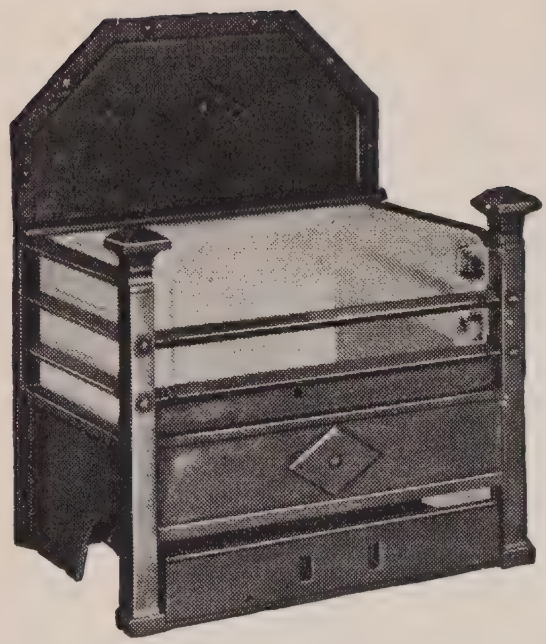
Involved in all this is the question of gas production and distribution. Assuming in particular cases that plants will be built at the collieries or at central points in the coalfields, a survey will be called for of gas requirements, this on the basis of linking up with the new plants where desirable, and in congested areas installing local gas grids, but only where it is obvious that national economy and coal conservation can be brought about by so doing.

In the same manner, power generating stations should be considered as part of the scheme in so far as they can be installed to utilize smokeless fuel obtained from coals which give a coke unsuitable for domestic purposes but which can be carbonized for recovery of its valuable smoke constituents.

These matters savour of Utopia ; but it is a Utopian situation we are aiming at, as far as the utilization of coal is concerned.

Government must take action.

In the light of present-day experience it is clear that there can be only one centralizing authority, and that is the Government. This does not mean Government control, but a central body to collect and analyse all the available experience and knowledge and to define the most suitable policy for development in the national interest. It must be made clear at this point that the proposals about to be made are for a body which will be advisory only, without executive power other than that essential for the collection of all necessary information.



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In the opinion of those competent to form a judgment on this important national problem the time has come for some form of central authority to be created of a permanent nature, whereby the whole of the statistics and appropriate information of the fuel industries may be centralized for the purpose of formulating a national policy.

Let us remember that we are at the beginning of a new era. We are at the beginning of an era which is to treat coal as the raw material of a manufacturing process, and the mapping of the road upon which this new era is to travel is a matter of the greatest national importance, calling for the advice of the highest authorities in each section of the industry. Only by one supreme central body can guidance be given which shall place the nation on the road that will provide the greatest benefit for all sections of the community.

This means a long-term policy, and the distant future is not yet clearly defined. Experience teaches us that we must have vision to progress, and the economics of life tend to dwarf the vision of the average individual concern. In the national interest, therefore, we must have a longer and wider vision, if we are to take the fullest advantage of technical progress.

In order to co-ordinate the whole of the power and heating requirements of the country, it is recommended that a new permanent central body be created by Act of Parliament. This central body should be under the control of a highly qualified person, capable of creating and organizing the necessary machinery for the collection and co-ordination of all information relative to the utilization of fuel, and with power to call evidence from authorities throughout the different industries. Such a body should have power, together with the necessary finance, to provide a suitable staff for the carrying out of this work. It should also have power to create a suitable advisory body, composed of technical and commercial authorities from the different industries, and to call for any other advice which might be considered necessary for the fullest investigation of our national fuel problems. Such a body would be the link between the State and the fuel industries, but with full Parliamentary authority to acquire all necessary information for advising the Government. This body would be in the nature of an advisory authority, whereby the whole of the information relative to the utilization of fuel would be centralized and co-ordinated for the purpose of deciding the proper lines to follow in the national interest, in order that the fullest economic value may be secured to deal with the power and heating demands of the country, if we are to make progress as a first-class nation.

The work of this body would make clear the road for each section of industry to travel, with a clear field for unfettered development, and new roads would be open for increasing the output of the coal mining industry, with increased employment. New industries would be created, with further increased employment, and industry as a whole placed on a sounder economic basis.

Industry in this great country has been built up upon our native coal ; but the time has now arrived when we must reconsider our position and plan to build under the conditions of a new era, in which coal will be the raw material for satisfying our modern demands in new forms. The new era demands a smokeless and pure atmosphere in which to live, and suitable solid, liquid and gaseous fuels for each and every section of our national activities.

SCIENTIFIC RESEARCH AND SMOKE ABATEMENT

By PROFESSOR R. WHYTLAW GRAY, O.B.E., Ph.D.

Research on the properties and behaviour of smoke is bound to influence our outlook on the wider problems connected with smoke abatement and atmospheric pollution. We know a good deal about the chemical character of smoke deposits, the proportion of tar, soluble and insoluble matter, sulphates, chlorides, etc., thanks to the researches of numerous workers and the activities of the Atmospheric Pollution Committee. Systematic observations are now made in many centres of the total suspended impurity in the air throughout the year and also of the sulphur dioxide present. It is, however, rather on the physical aspect of smoke pollution that knowledge is lacking, and I wish to direct the attention of this conference to two features of the suspended solid matter in the air which appear to me to be of significance. The first is the natural process of coagulation which is common to all smokes, and the second the range in size and relative numbers of the particles characteristic of smoke polluted air.

Apart from dust and grit the vast majority of smoke particles formed in combustion are initially very small, certainly of sub-microscopic dimensions, but they rapidly combine with each other and whether the pollution to which they give rise takes the form of large smuts or invisibly fine material depends on the degree of coagulation reached before the smoke escapes into the outer air.

In a dense smoke this process of coagulation takes place with great rapidity and if our chimneys were long enough the effluent would consist largely of gross aggregates or smuts and would contain relatively few of the fine floating particles which are so objectionable. Needless to say, this is purely an illustration and is not a practical suggestion.

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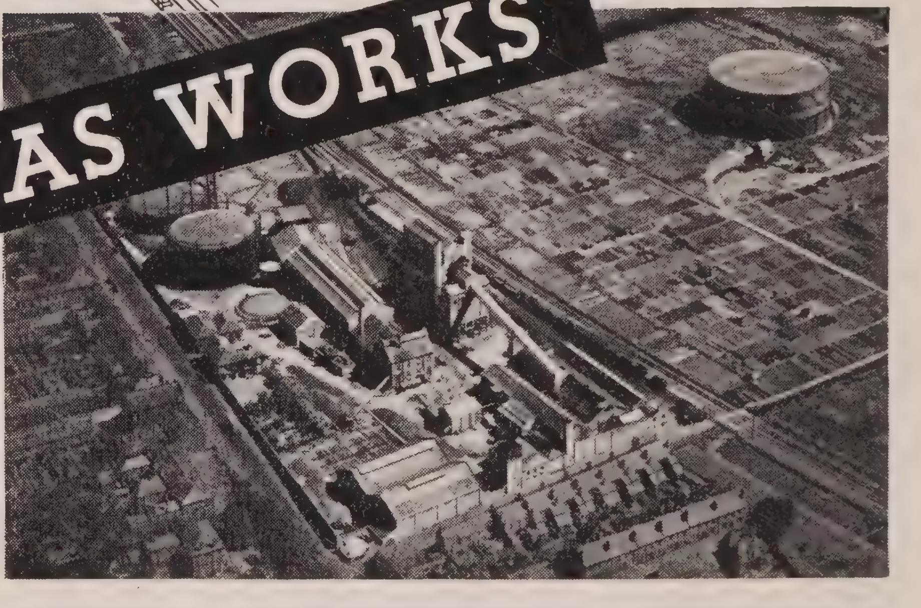

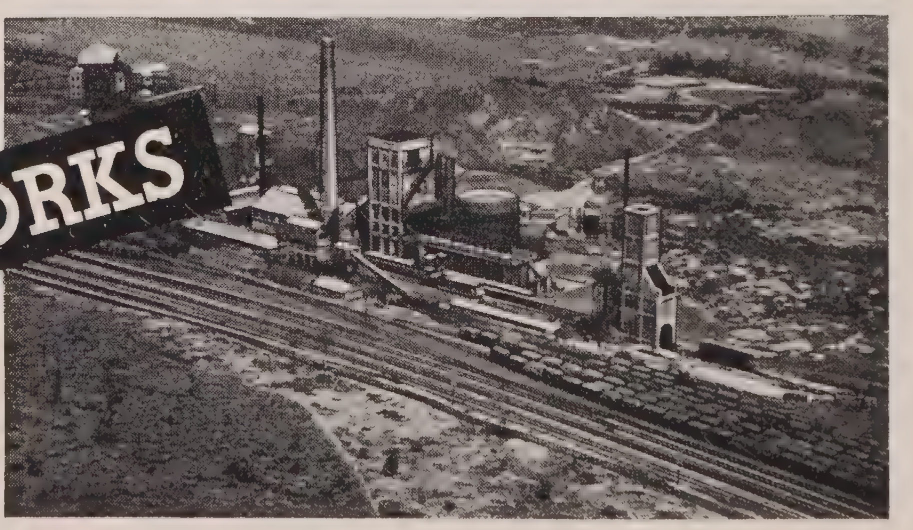

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When smoke escapes from a chimney into the open air it is rapidly diluted and coagulation then takes place with extreme slowness, for the probability of encounter of neighbouring particles is very small. The atmosphere hence becomes charged with myriads of fine particles which have not had time to flocculate or precipitate. It is these fine particles which are responsible for most of the evil effects associated with atmospheric pollution. They penetrate the respiratory passages and deposit in the lungs, they promote fog by acting as condensation nuclei for moisture, they scatter and absorb sunlight and they adhere firmly to any surface they encounter, producing the effects which are so evident in large cities such as Leeds. Large particles do not stick so firmly to surfaces and it is true to say that if the pollution in the air of our cities were in the form of particles of visible instead of microscopic and sub-microscopic dimensions the evil effects would be much less evident. It is the particles of less than 0.5μ radius that are most numerous in city air and which are the most deleterious.

It is a matter then of some interest and importance to determine what proportion of the air-borne impurity is in the form of these fine particles. It is desirable, too, to know just what size ranges are the most objectionable.

Are the ultra-microscopic and amicroscopic particles of any significance? Or should attention be focussed only on those which can be resolved under the microscope? Until recently no methods were available for a complete survey of the number and size of the various grades of particle in smoke pulluted air.

During the last year we have been working at this problem in the Chemistry Department of the University of Leeds and we are now in a position to estimate approximately the various sizes of finely divided solid material contained in the air of this city. It appears that quite a large proportion of the total weight of impurity is in the form of large particles, varying from 1 to 10μ radius. Though these may form as much as 60% by weight of the total solid in the air their relative numbers are so small that their detection requires a few cubic feet of air to be used. Standard instruments such as the Owens dust counter and the thermal precipitator, do not reveal their presence, because the volume of air sampled is too small.

These large particles consist of a variety of materials which can readily be identified under the microscope. Minute fragments of coal wholly or partially carbonized, coke, slaglike and glassy material, fused spheres as well as aggregations of much finer carbonaceous particles are common. Inside buildings it is these particles which settle out readily and form deposits of dust and dirt. They are, however, easily retained by filters such as are used in air conditioning plants.

Considering particles smaller than 1μ in radius we find that their numbers increase progressively with the decreasing size. Very few observations have been made on the numbers in the range 0.3 to 1μ radius but the range from 0.3 to 0.1μ that is down to about the limit of microscopic visibility, has been thoroughly explored. An average figure for this range for Leeds air is 2,000 particles per cubic centimetre. Though it is not contended that the most objectionable class lies wholly in the latter range there is no doubt that this group possesses all the harmful properties already mentioned. Probably the injurious character of polluted air depends on the numbers of particles it contains round about this size range. Beyond the limits of microscopic resolution there is, however, a very numerous class of particle only detectable with the aid of the ultra-microscope. The lower limit of size is doubtful but may be given provisionally as 0.03μ radius. A normal figure for the number in Leeds air is 30,000 per c.c. To complete the catalogue another class of still smaller particles must be mentioned, those which are too small to be visible in the ultra-microscope and which can only be detected by the Aitken counter or similar instruments. These, also, are about as numerous as the previous class. The total mass of the last two categories is very small and it is an open question whether their presence in air is harmful.

An examination, therefore, of the various sizes of particle in polluted air in Leeds reveals the presence of a class of large particle, few in number, but which forms a large proportion of the weight of the suspended impurity. It also shows the presence of a very numerous class of fine particle of sub-microscopic dimensions. Probably the most deleterious and objectionable class lies between these limits in the microscopic region and forms roughly about 50% by weight of the pollution.

What does emerge from these investigations is the wide range in size of the particles found in the air of cities such as Leeds, and when further data have been collected the possibility of establishing a better criterion of harmful pollution than we have at present.

(*Address given as Chairman at one of the Leeds Conference Sessions*).

Mr. Edgar Lunn.

Mr. Edgar Lunn, whose valuable work in Huddersfield for smoke abatement is well known, has recently been appointed Borough Electrical Engineer upon the retirement of Mr. J. W. Turner. It is through Mr. Lunn more than anyone else that the Huddersfield Smoke Abatement Council has been so successful. He has for a number of years been the lecturer in classes of instruction for boilermen and has been Hon. Secretary of the Council since 1928. About 300 students have attended his courses, about the beneficial results of which to the town there can now be no doubt. Huddersfield is fortunate in having Mr. Lunn.

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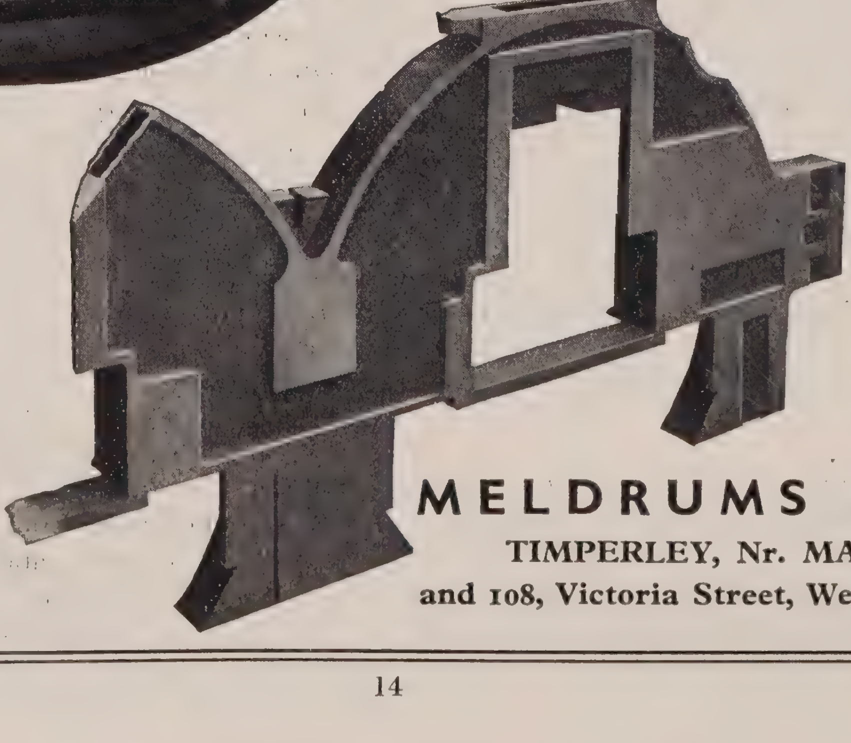

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NEWS FROM THE U.S.A.

A PROGRESSIVE COAL INDUSTRY

The Smoke Prevention Association.

Several papers and reports received recently show that considerable activity for smoke abatement is being carried out in the U.S.A.

The Smoke Prevention Association has issued, as one volume, a most useful Manual of Smoke and Boiler Ordinances and Requirements and the Proceedings of their 31st Annual Convention held in New York City in June last.

The Manual contains technical information and data on boiler and general combustion matters, a description of methods of measuring air pollution, with working instructions, a model ordinance adopted by the Association, and a summary compilation of answers to a questionnaire on smoke prevention sent to the principal towns in the country. The last is a very full analysis and gives all the essential information on administration and preventive activity.

The second part of the volume contains in full all the papers read during the five day convention. They are in substance rather different from our British conference papers, being either of a more technically practical nature or in the form of reports of the local campaigns and developments that, unlike our own, vary widely from place to place.

In view of the statements which at times are made on this side of the Atlantic regarding the smokelessness of New York owing to the prohibition of the use of bituminous coal—which are, of course, entirely misinformed—it is of interest to note that a paper on the fuel consumption in that city shows that this is in the proportion of three-eighths anthracite, three-eighths bituminous coal, one-eighth fuel oil, and one-eighth petrol. The last is, of course, mostly used in transport.

A paragraph from the December issue of *Smoke*, the monthly bulletin of the Smoke Prevention Association states that formal application has been made to the Federal Government for approval of an air pollution study project to be conducted under the auspices of the Works Progress Administration in the city of Chicago. The project is sponsored by the Department of Smoke Inspection and Abatement, Chicago, and contemplates the employment of 978 employees and outlines an expenditure of 965,622 dollars.

To consider such a vast scheme rather takes away one's breath. It seems colossal, but comparison with the actual cost of smoke, which goes on year after year, shows that it may easily, and actually should, quickly pay for itself.

Coal Industry Co-operation.

A report has been received of the conference organized in Chicago in October, 1936, by the Fuel Engineering Division of Appalachian Coals Incorporated. This took the form of a joint symposium with members of the Smoke Prevention Association and others concerned with smoke abatement, and was an expression of the desire of one of the nation's largest bituminous coal organizations to assist and extend smoke abatement and to ensure that their fuel should be burned with the least possible smoke. The first session consisted of papers of a general but practical nature, while the second session was devoted to papers dealing with the smokeless operation of various types of furnace—underfeed stokers, pulverizers, spreader stokers, residential stokers, industrial and commercial hand-fired furnaces, domestic hand-fired furnaces, locomotives, chain-grate stokers, and marine boilers.

In expressing greetings to the delegates, Mr. R. E. Howe, Vice-President of Appalachian Coals, Inc., said :

" There are many things of a broad nature in which Appalachian Coals can engage. Our engineering division has been particularly active in educational and co-operative work. To-day's meeting, in which there is co-operation with the Smoke Prevention Association of America, is a typical example of this type of work. Such activities are a power of good and will serve to establish new bonds and strengthen the old bonds between the coal industry and those who direct the use of its products.

" Our affiliated companies are engaged in the production of high volatile coals. We realize that these coals, rich in hydrocarbons, can be burned with or without objectionable smoke, depending on how they are fired. It is my understanding that in the course of to-day's meeting competent engineers will discuss proper methods for firing high volatile coals smokelessly in every type of equipment.

" It is our determined purpose to work with smoke abatement authorities everywhere towards the elimination of the smoke nuisance. We are very proud of the fact that our coals come from the finest deposits in the world, and we are very zealous of doing everything in our power to see that these coals are so treated by the consuming public that nothing will mar the rich endowment nature has generously bestowed on these coals. May I say to you that we are naturally and selfishly committed to the work of smoke abatement and that includes the work of your good association ? "

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- *HOT WATER SUPPLY*
- *AIR CONDITIONING*
- *GRASS DRYING*
- *SOIL WARMING*
- *GLASSHOUSE HEATING*
- *ORCHARD HEATING*
- *SMOKE PREVENTION*

The London and Counties Coke Association gives technical assistance to all users of fuel, to those installing heating or drying plant of any description, to Architects and to Heating Engineers. Its Engineers and Fuel Experts attend personally to advise on installations of plant, to carry out boiler tests and to assist in securing the greatest efficiency. The Technical Department of this Association makes a thorough investigation of the special needs of each individual case, freely and without obligation and gives impartial advice on the plant or the methods to be used.

★ Authoritative Brochures dealing with the subjects above ● have been issued by the Association; these give full descriptions and illustrations of the different types of plant which have been tested and approved by the Association. Copies will be sent free on request.

Write or Telephone :—

THE LONDON & COUNTIES COKE ASSOCIATION

1 GROSVENOR PLACE, LONDON, S.W.1 (SLOane 5136)

We feel that a meeting of this kind must have been of the very greatest value both to the smoke abatement interests and to the coal people. It indicates a most commendable and far-seeing enterprise on the part of the latter, and suggests that it might be possible and desirable if a conference on the same lines were held in this country. A few years ago it would have been hard even to visualize such an event, but to-day our coal industry is beginning to move towards the position which the Appalachian people can be congratulated upon in having achieved.

They have also sent us a little booklet which explains how the domestic furnace may be fired with a minimum of smoke—by top ignition and "front and rear" replenishment.

Coal Coking by Electricity.

Mr. H. Stevens, the author, sends us a reprint of an article of this title that appeared in *The Scientific American* of November, 1937. The process he describes appears to warrant close examination and further investigation. The principle of the method is that "a mass of 30 tons or more of coal is placed in a retort, with a 'starting fuse' as a core. The fuse, consisting of coke particles, is necessary because soft coal is not a good conductor of electricity. Carbonization is begun by passing electricity through this fuse, thus heating it and the surrounding coal to drive off the gas and tar.

"The coal immediately surrounding the fuse which thus becomes coke is a better conductor of electricity than the starting fuse. In the starting fuse the resistance to electricity is high because of poor contact between the loose coke particles, but the newly formed ring of coke is melted together and makes a continuous path for the electric current. On further heating this ring of coke shrinks and cracks, but not until a new outer layer of coal is carbonized. Each newly formed tubular ring of coke offers easier passage for the current. In this manner heat travels radially outward, always being electrically generated adjacent to the raw coal. This growth continues until the entire mass of coal is carbonized.

"Results from a typical 20 hour run of the 30 ton retort built by the Detroit Edison Company show that from one short ton of moist Pittsburgh seam coal there were obtained 10,000 cubic feet of gas with a heating value of 525 B.Th.U. per cubic foot, 15 gallons of tar, and 1,400 pounds of coke. These yields are slightly better than the results of tests made by the American Gas Association on Pittsburgh seam coal carbonized in by-product ovens."

Advantages claimed include complete heat utilization, large-scale production in large capacity retorts of moderate capital cost, and the ready control of temperature and rate of heat travel giving greater flexibility in operation to meet consumers' demands.

The efficiency of operation is so much greater that the process requires less fuel to do the carbonizing than is required in the by-product method : "Tests made by the American Gas Association showed that, in the by-product method, 292 pounds of *coke* were required to carbonize a ton of Pittsburgh seam coal. To do the same work, the electric process used 350 kilowatt-hours of electricity, the generation of which by steam power requires about 290 pounds of *coal*, a less valuable fuel than coke."

Waste steam from the electric power plant can be used to pre-heat the coal to drive off moisture, and this reduces the amount of electricity required to carbonize the coal from 350 to 250 k.w.h. A further factor on the economic side is that the development of the process would enable electricity to be used during off-peak periods. The process enables gas production to be increased or decreased at will, according to demand, thanks to the flexibility in operation that is obtainable. By varying the voltage the rate and degree of carbonization can be controlled, as can the proportions of the yields of gas and tar.

The author concludes by claiming that this process is of potential value to the coal industry, and electrical and gas industries, and, by reason of the smokeless fuel produced, to the community.

REGIONAL COMMITTEE NEWS

West Lancashire and Cheshire Regional Smoke Abatement Committee.

A meeting of the Executive Committee of the West Lancashire and Cheshire Regional Smoke Abatement Committee was held in the Municipal Annexe, Liverpool, on November 17th, 1937.

The Hon. Secretary (Dr. W. M. Frazer, M.O.H., Liverpool) reported that during the past two years a great advance has taken place in the design and application of apparatus for combustion control of solid fuel. A large number of laundries and small works in Liverpool formerly consumed furnace coke in their boiler furnaces but owing to the rising cost and difficulty in obtaining this fuel have reverted to coal. In Liverpool it has been suggested to these small boiler owners that they should install a small mechanical stoker to their boiler plant and during the last year approximately 50 of these stokers have been installed. These machines are all of the Underfeed type and this ensures that the

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fire burns with a glowing surface, the raw coal being fed from underneath. This prevents the formation of smoke because the volatile matter, as it is distilled off from the fresh fuel, is burned in passing through the incandescent zone above.

Mr. H. G. Howson, the Local Inspector of Alkali, etc. Works, was welcomed as an honorary member. He will assist the Committee in an advisory capacity on technical matters.

Copies of the handbook " Smoke Abatement and Fuel Economy in Industry " published by the West Lancashire and Cheshire Regional Smoke Abatement Committee are still available from the Hon. Secretary, Public Health Department, Municipal Annexe, Dale Street, Liverpool 2, at sixpence per copy.

Midlands Joint Advisory Council.

The Half-yearly General Meeting of the Council was held in Birmingham on 28th October.

A party of 20 representatives of subscribing Local Authorities met at the Council House at 10-30 a.m. and proceeded on a tour of inspection of certain works with a view to studying up-to-date methods of combustion in relation to the so-called exempted processes.

The first call was at the Bromford Tube Works, where Mr. Bonney, the Chief Engineer and two assistants conducted the party round the various furnaces for the reheating of steel billets. Pulverized fuel only is used by this firm, the fuel being first crushed and then blown into the furnaces by mechanical means. It was worthy of note that no smoke was emitted from the various stacks and that an inspection of the furnaces showed an almost complete absence of ash or grit.

The party then proceeded to the Brick Works of Messrs. William Nock Limited, where Mr. William Nock, Junior, Managing Director, personally conducted the representatives over the works. After seeing the clay pits, and pressing and drying sheds, the kilns were inspected and many of the party were surprised to see a continuous Hoffman kiln being stoked by mechanical means. The interior of one kiln was then inspected and Mr. Nock outlined the procedure of brick making.

After a luncheon held in the Council Library by courtesy of the Lord Mayor, and at which Councillor R. W. Brosch, Birmingham, presided, a visit was paid to the Glass Works of John Walsh Walsh Limited. The Managing Director, Mr. Riley, first conducted the party to the old Glass House, now in course of demolition, and described in most eloquent terms the methods of firing and production of flint glass-ware which formerly prevailed. Subsequently the new factory was visited and Mr. Riley demonstrated the method of firing the furnace with producer gas, the same plant also providing the heating and lighting for the factory. Furnace conditions were perfect with an entire absence of smoke emission. The employees were seen at work, blowing and moulding, and the cutting and polishing and stock rooms were also visited.

The Executive Committee of the Council then held their quarterly executive meeting, Councillor Brosch in the chair. Mr. Longfellow, Chief Sanitary Inspector, Rowley Regis, reported upon the success of the recent Annual Conference of the National Smoke Abatement Society, giving his views of the papers presented and the discussions which arose from them. The Honorary Secretary reported upon his collaboration with Dr. Anderson, Principal of the Birmingham Central Technical College and Mr. G. W. Farquharson, Senior Smoke Inspector, Birmingham, in regard to a course of lectures and demonstrations qualifying for the Smoke Inspectors' Certificate of the Royal Sanitary Institute. The Institute had approved the suggested syllabus and arrangements had been made to commence the course in January 1938.

West Riding of Yorkshire.

The Committee recently sent out a questionnaire relating to the value of employment of certificated stokers. While some replies were rather contradictory the following reply was felt to be representative and a fairly true statement of the position :

> " In this area it is hardly practicable to give any reliable information with regard to the comparative performance of certificated and uncertificated stokers and the frequency of offences, for it is found that the majority of smoke nuisances arise from circumstances largely outside the stoker's control, i.e. forcing of boiler at dyeworks, etc., during peak loads. It is, however, obvious that a properly technically trained stoker will limit the evil consequences of the foregoing circumstances better than an untrained one, and much more so if the engineer in charge co-operated and were equally properly trained. In the latter event, the circumstances indicated might often be brought under a much greater measure of control, even if not entirely eliminated."

The Committee also approached officials of the National Union of Enginemen, Firemen, Mechanics, and Electrical Workers with regard to the proposal for increased remuneration for certificated stokers. The District Secretary of the Union replied that after inquiries in the West Riding they had elicited the following points :

That in many cases boiler capacity is inadequate and that smoke is emitted continuously for this reason. That the Union regarded favourably special training for stokers and boiler attendants. That the adoption of the suggestion that higher wages should be paid to certificated men would present considerable difficulties from the point of view of the Union. However, Union rates are minimum rates and there is nothing to prevent employers paying a higher rate to certificated men.

HEALTH RESORT

AT BUXTON, as at all resorts similarly given over to the promotion of good health, purity of atmosphere amounts to stock-in-trade. In the choice of modernized gas works equipment a very big factor was the necessity for smoke-free operation. And, as at many other health centres, the chosen carbonizing plant was an installation of

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CROPS DAMAGED BY COKE-OVEN FUMES

FARMER'S ACTION

Before Mr. Justice Atkinson at the West Riding of Yorkshire Assizes, the case opening on 9th December last, James Ashwood, farmer, sued Houghton Main Colliery Company Ltd., alleging that fumes from the colliery coke-ovens and spoil heaps had damaged his crops.

Mr. C. Paley Scott, K.C. (for Mr. Ashwood) said the damage had been going on for some years, but until three or four years ago Mr. Ashwood had been employed by the colliery. The coke-oven plant worked 24 hours a day, and emitted a black smoke when opened. When the coke was taken out it was quenched with water, and an enormous cloud of smoke carried with it a tarry and sulphurous vapour which, it was alleged, caused the damage to Mr. Ashwood's crops.

The farm lay to the east of the colliery, and the prevailing winds were south-westerly. The distance from the colliery to the furthest point of the farm lands was about one mile. Except when the wind was from the east there was a noticeable smell over the area of land.

Analysts and chemists would say that the damage to crops was twofold. Firstly, the depositing on the growing herbage, especially when it was young and tender, of fine particles of carbon that were rendered sticky by tarry and poisonous matter which adhered to the plants, preventing them from breathing properly and choked them. Secondly, there was actual burning of the young and tender plants, so that they did not grow properly. The damage was not being done every day. A field might be damaged and almost ruined on one occasion by one cloud which happened to come in exceptional concentration and settle on the crop when it was most tender.

Mr. J. A. Foster, analyst to the West Riding Branch of the National Farmers' Union said in March he found large patches of scorched wheat, curled over and discoloured at a time when the shoots would normally be a pale green. In April he found the damage to wheat had extended and more than half of the plants were destroyed. The remainder were unhealthy. Hardly any of the clover was showing.

Mr. John Neal, counsel for the colliery company, claimed it had not been proved that damage to the crops had been caused by atmospheric impurities or that the company were in any way liable to the damage to the crops. It was strange that there had been no evidence fo acidity of the soil itself, since the ovens and dumps had been in use for many years, he said. Tests of the soil had been taken and in every field except one the results were neutral.

There was also, counsel submitted, a lack of satisfactory evidence about the actual loss sustained by plaintiff through poor crops. Out of 92 acres comprising the farm, plaintiff was claiming in respect of 72 acres. If his loss were as large as he alleged, over £200 in one year, plaintiff had been carrying on for years at an annual loss two or three times as much as the rent of the farm.

Mr. John Denham Evans, public analyst to the Sheffield Corporation and other local authorities, a witness for the company, said his examination of plaintiff's farm revealed no trace of injury to the soil by sulphuric acid, and no trace of tarry matter affecting the crops.

The Summing Up.

Mr. Justice Atkinson, in his judgment, referred to the 60 coke-ovens owned by the colliery company, and said he had no doubt that they emitted serious quantities of gases of a harmful nature. Deleterious gases were also given off by the refuse dump, which was a hundred feet high. Those gases and chemical matter could, given the necessary atmospheric conditions, damage Mr. Ashwood's crops.

His Lordship said he had no doubt that the failure of crops concerned in that action was in substance caused by the emissions from the ovens and the dump.

The defendant Company had put forward the rival theory that the damage was due to bad farming and weather conditions. There was, however, no reliable evidence of bad farming. On the contrary, there was evidence that the land was well farmed. Further, other farmers in the neighbourhood had spoken of damage, and they could not all be bad farmers.

Mr. Justice Atkinson said the point was made that the kind of damage referred to must have gone on for years without complaint. There could, he said, be no doubt it had been increasing. Further, until 1932, Mr. Ashwood was employed by the colliery company, and one could well understand that a farmer without any real financial resources would hesitate long before taking proceedings against a colliery company.

Dealing with the question of damages, Mr. Justice Atkinson said that Mr. Ashwood was at fault in not keeping records which would have enabled him to give precise details of the damage alleged. In substance, his Lordship was constrained to rely on the lowest figures given by the witnesses.

Among the damaged crops for which his Lordship allowed sums totalling £160 7s. were clover, grass, potatoes, wheat, oats, straw, and turnips.

Judgment was entered for Mr. Ashwood for the sum named, with costs.

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PEP HEALTH SERVICES REPORT

The P E P (Political and Economic Planning) Report on the British Health Services is an imposing volume and indicates a vast amount of work on the part of its anonymous authors. It disentangles and explains with remarkable success the complexity of services, methods and objectives which in one way or another seek to keep us healthy or to cure us when we are sick.

On receiving publications of a nature such as this we are primarily interested to see if our own particular problem of smoke abatement has received adequate and correct treatment. Only too often is it found that it has been dealt with in a way that betrays either a slight and hastily acquired knowledge or a lack of understanding of what the question really implies. The references to atmospheric pollution in the P E P report are necessarily few and brief, but they are there, and what is more, they are both adequate and correct.

One and a half pages is given under the section entitled " Impersonal Protective Services," and in the " Summary and Conclusions " the present state of affairs is admirably summed up in the words " Atmospheric pollution by smoke and other nuisances has no more than begun to be recognized as a national reproach to be removed by governmental action."

The effects of smoke upon health are mentioned with restraint, but do not lose emphasis on that account : " Clear, fresh air and sunlight are valuable elements in health, yet in many urban areas for weeks at a time the air is continuously polluted by smoke and the sunlight blotted out by a black pall. Undoubtedly some of the respiratory diseases, such as tuberculosis, pneumonia and bronchitis, which account for more deaths than any other groups of diseases, may be aggravated by the amount of smoke inhaled in large towns. Direct evidence of this is afforded by the increase in deaths from respiratory diseases among London boys and the high death rate from bronchitis in particularly smoky areas. Further, absorption of the sulphur acids in smoke indirectly damages the tissues of the lungs and by preventing oxidization may cause heart failure. Moreover, the cutting off of ultra-violet radiations which ' activate ' the formation of vitamin D in the skin, and consequently enable the body to utilize important foodstuffs, seriously affects the health of town-dwellers."

Naturally the bulk of the report is outside the limited province of this *Journal*, although the chapter reviewing the health problem has many points which have a bearing upon the Society's organization and work. Most of the conclusions regarding " Voluntary " bodies do not apply to a specialized work such as ours, which is concerned with many aspects other than health. Nevertheless we feel we are included when it is said that all the voluntary bodies " have to devote a large proportion of their energies to raising funds and advertising their successes." This, and other observations give rise to reflections on whether smoke abatement could be better organized and whether a more effective co-ordination could not be obtained between the various bodies that are seeking to end atmospheric pollution either by education and general services (the Society), administration (local authorities and Regional Committees), investigation (the D.S.I.R.), and practical application (industrial interests and utilities).

The report should be in the hands of all who are in any way concerned with or interested in any aspect of health services. Cloth bound copies are available at 10/6, paper boards at 7/6 (postage 6d.) and are obtainable through booksellers or direct from P E P, 16 Queen Anne's Gate, London, S.W.1.

NEWS AND VIEWS

The Mayor of Oldham.

Councillor A. J. Howcroft, in his address at his inauguration as Mayor of Oldham, spoke strongly about the need for improving the atmosphere of the town. " As a countryman," he said, " I am amazed that in our advanced civilization we should tolerate the perpetual pollution of the vital air to our own injury and detriment. If we sit down on the moors about this district we get up to find an imprint of the heather or grass upon our hands or clothes. We are told how many tons per acre of this vile stuff which we are breathing falls on the town every year. Yet we are not in the least excited about it. We simply set about pulling down houses wholesale to give the people more room to breathe. To breathe what ? God's vital air ? No, a sooty sulphurous blend which man has made, the ally of disease. With remedies close at hand within our grasp it is a blot upon our generation that it should continue."

The End of the Story.

More than a dozen different agencies take a picking between the pit and the domestic hearth, and no doubt there is some profiteering here. We are paying through the nose for sentiment. We hear much nonsense about " loving a cheerful coal fire," but it is stupid to trundle bits of crumbly blackstuff from pit to washery, from washery to truck, from truck to remote depot, from depot to wagon, and from wagon to the street door—and then only get inefficient combustion plus a polluted atmosphere.—*Mr. W. A. Lee, Secretary of the Mining Association.*

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Cabinet Secret.

" It seems that Cabinet Ministers to be transferred to modern quarters in the new Government buildings in Whitehall are to retain one antiquity as a concession to their affection for hoary things. Although the most modern electrical devices are to be fitted in all other rooms, the Cabinet Ministers are to retain old-fashioned coal fires as well. There has been argument, but I understand the Cabinet " Blimps " have won the day.

" Gad, sir, how could an English statesman formulate any policy worth while if denied the privilege of thinking it out with hands tucked under his tails and his backside to a glowing fire ? Let the Smoke Abatement Society hide its iconoclastic head."—*Tom Clarke in "Reynolds News."*

The Most Deadly Cagoulard.

Oliver Stewart, writing in *The Tatler* on fog, smoke, and flying, said in the course of his article : " There is mist and there is fog. Mist is as necessary as rain ; but it is very different from smoke fog. Smoke fog is an inhabitant of those regions where humanity smokes —smokes crude coal. Where the belching factory chimneys are and where the myriads of little coal-smoking chimneys are, there will be the smoke fog also. If you fly about over England, as I have done, you will get to know the huge, yellowish patches of smoke fog. A big one hangs over London. Manchester has its own filthy pall, and so has Glasgow. It is astonishing when you look on these smoke fogs, that Governments can have the impertinence to talk of fitness campaigns when they have done nothing effective to give people the fresh air and sunlight which are the pre-requisites of fitness. And remember this, that, although on some days on the ground you are not conscious of the smoke fog, it is still there and it can nearly always be seen from the air. Moreover, there are times when it does not seem to affect the visibility on the ground but when it affects it a good deal in the air and makes navigation more difficult.

" With every increase in the speed of travel, with every increase, more especially, in the speed of aircraft, the need for reducing, so far as is possible, the incidence of smoke fogs is also increased. We cannot abolish mist, which makes navigation difficult enough, but we can reduce the thickness of smoke fog. There is nothing to lose by doing so and everything to gain, everything in the matter of health and in the matter of aerial and other forms of navigation. Even the man who, like Mr. Lynd, piles his fire up with ordinary coal and sends clouds of smoke pouring up the chimney, will agree, the moment he pauses to think about it, that smoke fog should be prevented. Of all the cagoulards, the smoke fog is the most deadly, the fog which puts its *cagoule*, or hood, over the big cities of England and which not only makes life miserable for the inhabitants but which also makes it more difficult and dangerous for all the transport services."

Small Consumers of Coal Blamed.

Domestic and small industrial consumers of coal were responsible for at least 80 per cent. of the smoke produced in this country, said Lt.-Col. J. H. M. Greenly, chairman of the Coalburning Appliances Joint Consultative Board, at a luncheon of the Coal Industry Society in London on 6th December. Small consumers, he said, used less than one-third of the total coal consumed. The appliances they used were inefficient, whereas the big industrial users and the power stations were keeping pace with modern methods and standards.

Smoke Abatement in Parliament.

Mr. Tinker, Member for Leigh, on 9th November, introduced a Bill to amend the Public Health Act, 1936, with regard to coal mine refuse liable to spontaneous combustion. Mr. Tinker, in his speech, said " Those who do not live in mining districts or do not pass through such districts do not realise what burning pit heaps mean. They are the accumulation of waste matter from the collieries. The huge pits burst into flames after a time and cause great discomfort and ill health to those living in the vicinity." He outlined what might be done and referred to the need for taking such a necessary step for the preservation of the beauties of the countryside. The question was put and agreed to ; the second reading being on the 17th November.

On 2nd December Sir Percy Harris (Bethnal Green) asked the Minister of Health to consider legislation to transfer powers to deal with the smoke nuisance from the small local authorities to the county councils. He referred in particular to the condition of the atmosphere in London.

Sir Kingsley Wood in reply said that there was already power for the local authorities to combine so that they could work on a larger scale, and transfer to County Councils the functions of local authorities in default. He added that a meeting of local authorities of Greater London had been called by the National Smoke Abatement Society to consider forming a smoke abatement committee.

Sir Percy Harris : Is it not a fact that the conditions last week were a disgrace to London, and especially to his Department, which is responsible for the health of the people ?

Sir Kingsley Wood said he thoroughly agreed.

On 23rd December Sir Percy Harris asked further questions to the Minister of Health, relating to the number of prosecutions for smoke nuisances in London and to the non-enforcement of the law by borough councils. He further asked if he would detail an officer to investigate the whole problem of smoke in London.

Sir Kingsley Wood said he was looking forward to the formation and the meeting of the Joint Smoke Abatement Committee for London, and hoped something would be achieved during the New Year.

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Pottery Smoke.

At a meeting of the Royal Sanitary Institute in Hanley on 26th November, a paper on industrial smoke was read by Mr. H. Spencer, Chief Sanitary Inspector for Stoke-on-Trent. After describing the various methods of firing pottery kilns and ovens, Mr. Spencer said that progress had been made by the manufacturers in recent years. There were in the city 21 electric kilns, 41 gas-fired ovens and kilns, and 13 others were under course of erection. The electric kilns consumed 9,000,000 units per annum, taking the place of 8,000 to 10,000 tons of coal. The gas-fired ovens and kilns consumed over 900,000,000 cubic feet of gas per annum, which was equivalent to 47,242 tons of coal. A number of gas-fired kilns were fired by producer gas manufactured on the respective works.

With regard to burning tips, said Mr. Spencer, indiscriminate tipping of refuse of all kinds, when not properly controlled, created a serious nuisance to the inhabitants in the vicinity. Colliery waste tips created a serious nuisance to the public by the liberation of smoke and fumes. The authorities throughout the country should take up the matter of control of such tips, especially with regard to sites, heights, and methods of tipping.

Gilbert White and London Smoke.

Lord Ponsonby, speaking at a meeting near Farnham, Surrey, referred to a curious phenomenon that was described by Gilbert White, living at Selborne at the end of the 18th century. This was a mist which he called " London Smoke." When this mist appeared it was usually followed by fine dry weather. Lord Ponsonby thought that name was just fancy, but he had had complete corroboration of it from a great weather expert who lived not very far from their own district. He told him of two occasions when he had noticed this heavy dark cloud coming from the north-east. Once it fell in rain and observing it very carefully he found that the rain contained smuts of soot. Shortly afterwards it fell in snow, ordinary white crystals of snow. He watched it carefully and as the snow fell on the ground it became greyer and greyer and then black and the core of the crystal snow was smuts from London. It was curious that Gilbert White's description of it 150 years ago as London Smoke should now have proved to be literally true.

Fuel Economy Review.

The Fuel Economy Review for 1937, recently issued by the Federation of British Industries, is, as usual, a valuable and interesting publication for all concerned with the methods of smoke abatement. There are articles on the industrial uses of coke, on fuel oils, on gas and electricity, on coke oven gas, and one on " Fundamentals of Smoke Observation " by Dr. J. S. Owens.

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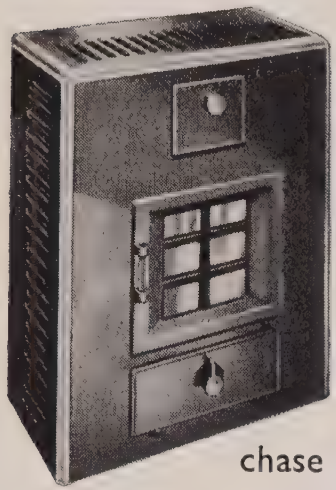

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COKE IN OPEN GRATES

A FUEL RESEARCH REPORT

The Fuel Research Department of the D.S.I.R. has issued a new report on " The Uses of Coke in Open Domestic Grates " (H.M. Stationery Office, 1/-). The scope of the inquiry is indicated by the summary, which is printed in full below in the form in which it appears in the report. As far as low temperature cokes are concerned, the experiments are of some interest, although they do not appear to have produced results of any outstanding importance. With regard to high temperature coke, however, with which the report is mainly concerned, it is difficult to appreciate why so much attention should have been given to the performance of coke in grates in which it is not normally used, and why so little attention should have been given—three short paragraphs—to its uses in the special grates in which, in practice, it is always used.

To be informed, for instance, that the sizes of high temperature coke that can be used in a well-grate are very restricted, and that with denser and more refractory cokes the size is still more restricted, or even unsatisfactory for any size, is hardly illuminating in view of the fact that such coke is never used or recommended for such grates.

The influence of moisture is usefully stressed, which is as it should be. The writer, accustomed to the use of a dry vertical coke, has recently been able to compare with it, in ordinary domestic use, a high-moisture quenched coke. Apart from the points mentioned in the summary below, such coke crackles and spits most unpleasantly on ignition or when replenishing. Further, it is not conducive to satisfaction to know that something like 10% of the coke bill is payment for water at a price of 45/- a ton.

The Report Summarized.

Preliminary Experiments. Preliminary experiments were devoted to finding suitable methods of testing cokes in open grates which could be reproduced within an accuracy of approximately 2 per cent. and which at the same time were capable of indicating the main burning characteristics of the fuel. A simple method of test was evolved, which consisted of lighting a single charge of fuel with the minimum amount of heat required for ignition and measuring by means of a radiometer the rate of radiation from the fire throughout its subsequent combustion.

The measurements taken during the course of the test enabled the quality of the fuel to be assessed according to its ease of ignition and speed of initial burning, its maximum rate of heat emission into the room, its sustained burning characteristics and general appearance during combustion.

The tests were supplemented, when required, by long period tests in which the fuel was maintained at a constant average level in the grate by refuelling.

Influence of Size of Coke on its behaviour in Open Grates. The ease of ignition, rate of initial combustion and level of rate of radiation of coke fires were determined for different cokes burning in two types of grate. In the well-type grate, the optimum size of low-temperature coke was found to be 1½-2 in., while for less combustible cokes, a smaller size of 1-1¼ in. gave the most satisfactory results ; with low-temperature cokes, sizes below 1 in. were found to be unsuitable. In the vertical-bar grate, the size of fuel had less effect on the combustion of both low- and high-temperature cokes than in the well-type grate : the optimum size for both types of coke was 1-1¼ in., low temperature coke above 2½ in. and the less combustible high-temperature coke above 1½ in. being unsuitable. Tests have shown that controlling the draught by closing the fret affects the combustion of the various sizes of coke differently in the two types of grate.

Effect of Increasing the Quantity of Lighting Material on the Initial Combustion of Coke. With free-burning cokes, an increase in the quantity of lighting material in excess of the minimum quantity required for ignition has comparatively little effect on the initial combustion. With the less combustible cokes, however, both the initial and subsequent combustion are influenced by the quantity of lighting material. When gas is used for ignition purposes, the rate of gas consumption is more important for fuels of low combustibility.

Effect of Moisture on the behaviour of Cokes in Open Grates. Moisture is found to affect seriously the ignition and initial combustion of cokes, and to reduce the level of radiation roughly in proportion to the moisture content of free-burning cokes. With the less combustible type of gas coke the effect was even more marked, and large amounts of moisture led to considerable difficulty in igniting the charge.

No evidence was found for the statement that a small percentage of moisture assists combustion, though it may be beneficial in " fixing " coke dust.

Effect of Shape and Design of Grates on the Combustion of Cokes. Experiments on various grates have indicated that the depth of fuel has a great influence on the combustion of cokes : increasing the depth of fuel, up to a certain point, although tending to delay the initial combustion of the surface fuel, increases the maximum rate of radiation from the fire. If the depth of fuel is increased too much, it becomes necessary to use a larger size of fuel in order to reduce the increased resistance in the fuel bed.

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Moderate variations in the width of the grate appeared to have little influence on the rate of combustion and emission of heat.

Substituting firebrick for metal firebars affected only the smaller sizes of coke, the initial combustion being retarded but the maximum rate of radiation increased.

Tests on a grate provided with wide-spaced, backward-sloping firebars and gas ignition, and designed for burning gas cokes, showed that satisfactory results were obtained, provided that a good-class gas coke was used and that the bulk of the fire was not allowed to fall below about half the full grate capacity.

Effects of Draught Regulation on the behaviour of Coke in Different Grates. Adjustments to the canopy in either the well or bar grates used for the tests appeared to have no effect on the rate of combustion of a free-burning low-temperature coke. Adjustments to the fret in the well-grate affected the rate of combustion of all sizes of low-temperature coke, but in the bar grate the rate of combustion of only the small sizes could be regulated by this means. Closing the windows and doors and so reducing the area of air inlet to the room to approximately 25 sq.in. had no effect on the rate of combustion of the coke.

As a result of experiments on increasing the draught artificially through the fuel bed, a device was evolved for attaching to open grates to improve combustion.

Effect of Ash Content on the Combustion of Cokes. An increase in ash content, though not affecting the ignition and initial combustion, reduces the rate of radiation and increases the rate at which the radiation diminishes after the maximum has been attained.

The quality of the ash has been found to be of almost equal importance to the quantity of ash ; light-coloured floury ashes are to be avoided as they not only spoil the appearance of the fire, but cause greater restriction of draught in the fuel bed. For this reason cokes prepared from dust or finely crushed materials generally give low rates of heat emission and produce an excessive volume of finely divided ash on the surface of the bed.

Influence of Mode of Manufacture on Combustibility.

Temperature of Carbonization.—Tests on a series of cokes prepared at temperatures ranging from 400°C. to 900°C., showed that the temperature of carbonization had a marked effect on the combustibility. Cokes produced at 700°C. and below were easy to ignite and burned freely, while those produced at the higher temperatures were difficult to ignite and slow in combustion.

Volatile Matter and Coke Structure.—It was found that volatile matter and coke structure may be of equal importance in determining the combustibility of a coke, for whereas the free burning of a coke may be reduced by a reduction in volatile matter, it may also be improved by a suitable alteration in structure of the coke substance.

Type of Coke used in Carbonization.—Examples are given showing the marked differences between cokes carbonized under conditions such that they contain the same volatile matter content, but prepared from different types of coal.

Bulk Density.—Bulk density is found to be an important factor in determining the combustibility of cokes, an increase in bulk density by itself increasing the difficulty of ignition and retarding the rate of initial combustion. Provided that dense cokes are made easy to ignite by having a relatively higher amount of volatile matter, or by blending with suitable coals to give an improved structure, they are to be preferred to low density cokes on account of their more lasting properties in the fire.

Comparison of Coal and Coke in Open Grates. The essential differences between coals and cokes are discussed in the light of the present experiments. It is concluded that a combustible coke may be superior to normal household coal from the point of view of freedom from smoke, ease of ignition, and rate of initial combustion, but that control of the rate of radiation can be more easily achieved with coal.

CORRESPONDENCE

Smoke in Whitehall.

The Editor,
Journal of the N.S.A.S.
Sir :

I have just come across your letter in *The Times* of October 21st last.

I understand that your efforts have the support of H.M. Government and it is therefore amazing that the worst offenders in the West End of London are Government Offices. In winter time the chimneys of the Admiralty, War Office, and Ministry of Agriculture belch forth clouds of smoke which hang in the form of a foul pall over the Whitehall area. The air is full of smuts and at times the pall descends right down to the ground so that passers-by breathe a mixture of contamination which would undoubtedly make a medical man shudder.

This state of affairs is a crying disgrace to any city which has any pretence to modernity. You are at perfect liberty to make what use you like of this letter and any humble efforts of mine which can assist you in your efforts to remove the smoke scandal with which Great Britain is afflicted are at your entire disposal.

Yours, etc.,
CHARLES M. MORRELL.

(*continued on page* 32)

(To this letter we may add a paragraph from a letter from another new member of the Society. This reads : " Unfortunately, I have very little spare time or I would run round and get people interested, but I have in the past done voluntary work for cripples and I know, in the industrial districts, such as the Black country and Birmingham, what a crime it is that sunlight should be shut off by the factory chimneys—the work I did was in connection with diseases such asrickets, T.B., etc., a vast amount of which might be mitigated by children having access to clear air.

" All the Government offices set a glorious example by having big open coal fires, I believe, and Whitehall testifies to this."

The same point is frequently made, and is supported by the paragraph of Mr. Tom Clarke's which is quoted on page 25. We should be glad to have further expressions of opinion and suggestions for a special offensive on the Whitehall front.—*Ed.*)

Ivor Brown on New York.

It is strange to hear New Yorkers complaining of polluted air and the smoke nuisance. Their sky seems on a good winter day to have the bright radiance of eternity, a fact the more astonishing when you remember the crowded millions who have to be washed, warmed, and cooked for upon one small island. But smokeless fuel, the ban on steam-trains in the city area, and the supply of steam-heat from central sources do solve the question of clean air far better than is done elsewhere. To stand on a dry day on one of the bridges or take a river-ferry and survey the town from the water is to see all its skyward thrust in perfect clarity of mass and detail. The air does not play misty, murky tricks like our thick and treacherous London sky, and of course, there is some gentleness lost in the hard, bright framing of the scene. But one absorbs far less filth into one's lungs, and need not be perpetually washing hands.—*Ivor Brown in " The Observer."*

Atmospheric Pollution in Toronto.

Two recent issues of the Bulletin of the Ontario Research Foundation contain articles on the smoke problem which appears to be serious in Toronto. A comparison of total solids deposit at various points in the city is contrasted with similar figures for British stations. Expressed in pounds per acre per month, the deposit at three central stations is 104, 183, and 120, compared with 114 for London (Horseferry Road), 139 for Central Bradford, 104 for Park Square, Leeds. The Connaught Laboratory Farm, five miles north of the city registers a monthly deposit of 36 lb. per acre, compared with 31 at Kew.

A photograph illustrating one of the articles shows the familiar " soot-and-whitewash " effect on a Toronto building.

The second article, dealing with the effects of smoke, mentions the work of H. M. Barrett carried out in 1934 at the School of Hygiene, Toronto, to ascertain the influence of a smoky atmosphere on the anthracitic effect of ultra-violet radiation. His results indicated that smoke in concentrations ordinarily occuring in urban atmospheres possesses the power to absorb antirachitic rays to such an extent that their power to prevent rickets in rats is considerably diminished.

Airport Smoke at Chicago.

The city moved yesterday to combat the smoke screen which officials of Chicago airport have termed dangerous to planes landing on or taking off from the field. The smoke pall is thrown over the airport by factories in the Clearing industrial district on days when the wind is from the south or south-west.

Frank A. Chambers, head of the city smoke abatement department, declared that unless the factory owners adopt smoke control methods they will be brought into the Municipal courts on charges of violating the smoke nuisance ordinance. While Clearing is outside the city limits, City Prosecutor Michael L. Rosinia held yesterday that the city has the right to control and license outside industrial plants operating within a mile of Chicago, which create a nuisance inside the city.

The dangers of the smoke screen were brought out a few days ago in a letter sent to Chambers by John A. Casey, airport superintendent. He said that commercial airline and charter operators and military flight officials have made many complaints about the dense smoke clouds.—*Chicago Sunday Tribune, 19th December,* 1937.

Plans for court action to force abatement of the smoke nuisance at the Amalgamated Roofing Company, 6600 South Central Avenue, were dropped yesterday when plant officials notified Frank A. Chambers, head of the department of smoke inspection and abatement, that two automatic stokers had been installed and other improvements in smoke control were being made. Stokers eliminate smoke clouds caused by faulty firing.

Representatives of eleven plants in or near the Clearing industrial district, south and southwest of Chicago airport, assured Chambers of their co-operation in freeing the district of smoke dangerous to airplanes.—*Chicago Daily Tribune, 1st January,* 1938, *quoted from " Smoke."*

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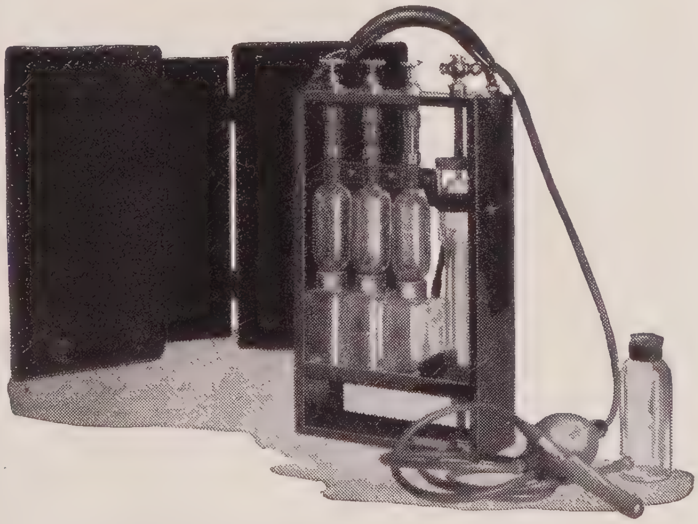

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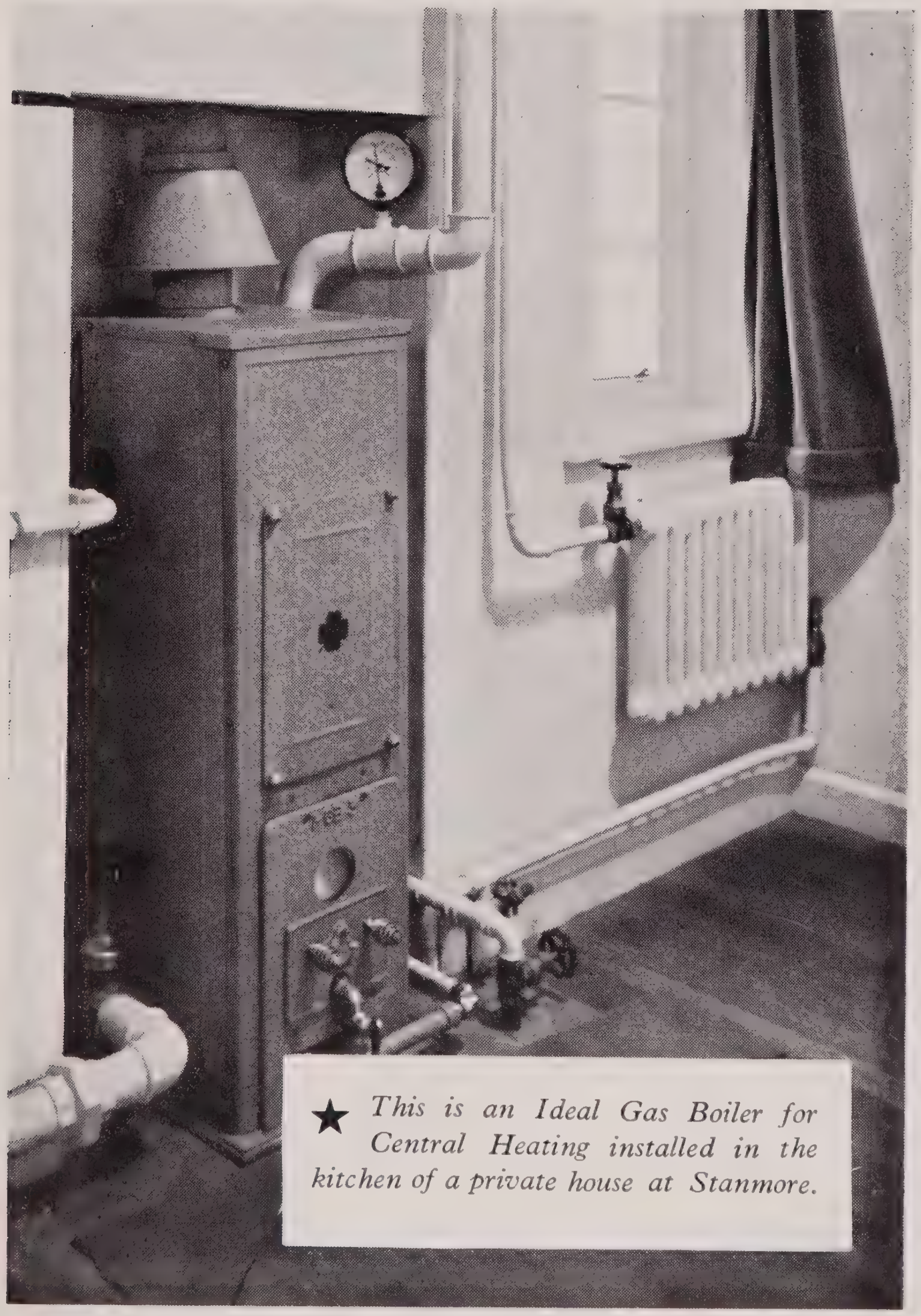

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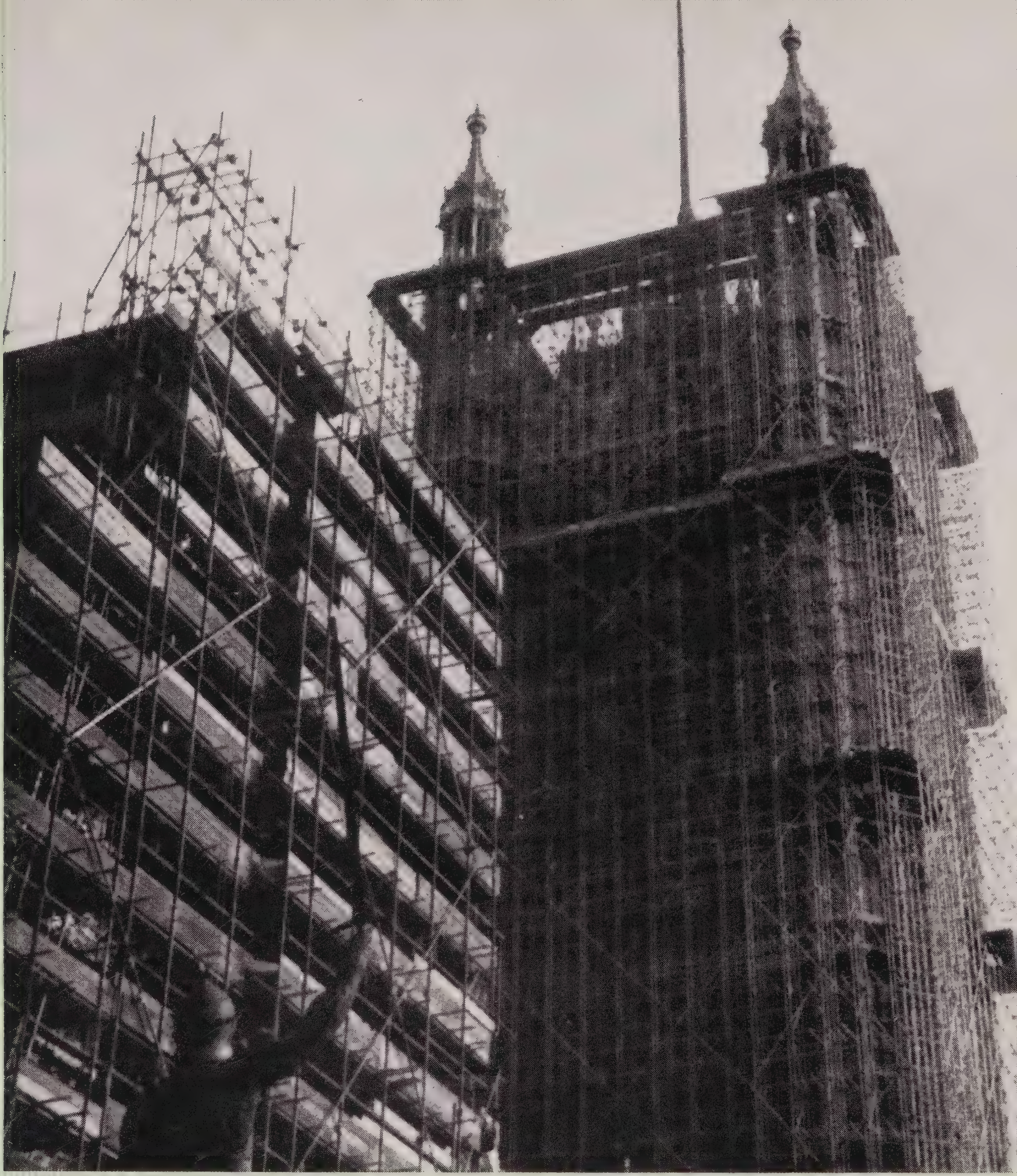

The Victoria Tower, Houses of Parliament (see page 36).

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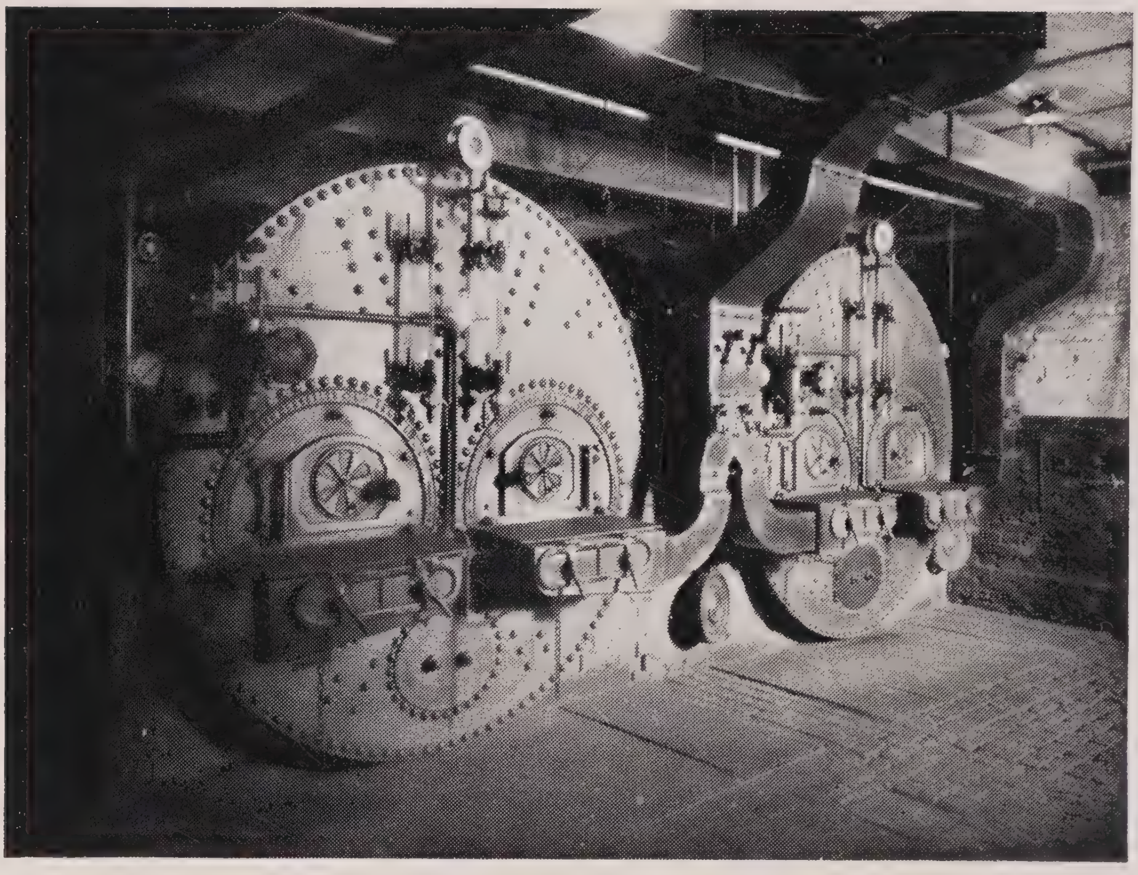

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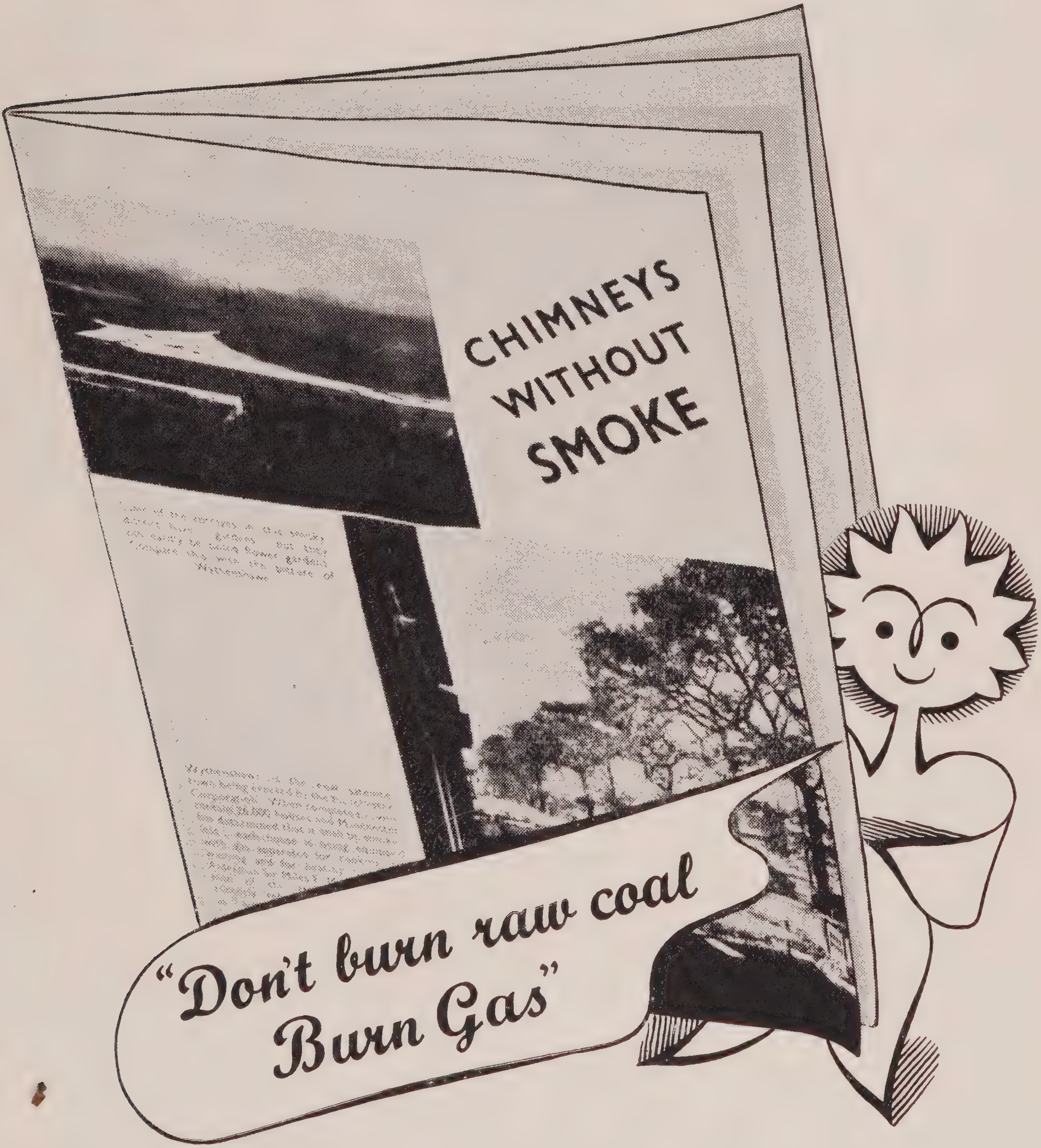

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WHERE water cooling has solved the refractory trouble, smoke is the limiting factor, and the percentage of excess air decreases with increased rating, or, to state this inversely, when the temperature of the furnace is decreased the percentage of excess air must be increased to offset the lowering of temperature in order to get anything like complete combustion. Furnaces therefore must not be over-cooled.

The Journal of the National Smoke Abatement Society

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Chandos House,
Buckingham Gate,
Westminster, S.W.1.
Telephone : ABBey 1359.

Advertisement Office :
The Service Guild Ltd.,
49, Deansgate, Manchester, 3
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Vol. 9. No. 34. May, 1938.

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The Journal is open for free discussion of all aspects of the smoke problem, and the opinions expressed in contributed articles are not necessarily the same as the views of the Society. Quotations and abstraction of matter appearing in the Journal is welcomed, provided the usual acknowledgements are made.

COMMENTARY

THE support given to the conference of Greater London authorities, which is reported elsewhere in this issue, indicates that there should now be little difficulty in establishing a strong and representative Advisory Regional Committee for that important, but rather neglected area. Interest in smoke abatement is much keener than it was a few years ago, and is particularly evident among some of the outer authorities, where vast housing estates and new industrial areas contribute to and extend Greater London's unbroken smoke pall. The Society was asked to continue with its help and to convene the further meeting that will be required to set up the Committee. This, it is anticipated, will be held in June. It is thought likely that the Committee will have a constitution similar to those of the existing Regional Committees and not as that of the earlier Joint Committee in London which consisted of representatives of industrial associations as well as of local authorities.

A statement forming a short paragraph in the last issue of the Journal was wrongfully attributed to Mr. W. A. Lee, secretary of the Mining Association. When our attention was drawn to this reference to the Press report from which the paragraph had been extracted it showed that we had quoted, not what Mr. Lee had said in an address, but what were in fact comments on what he had said—comments that were indeed contrary to his opinions. We were naturally most concerned that such an unfortunate error had been made and for the annoyance that it must have caused Mr. Lee. He was, however, kind enough to accept the expression of regret we were only too anxious to make to him.

The results, in money, of the broadcast appeal on 6th February form a valuable addition to the Society's funds, even though in comparison with " good causes " that appeal to the heart rather than to the head the total is low. Just over £151 was received, much in the form of small donations, some of which were as small as one or two three-halfpenny stamps. A number of the contributions were in the form of first annual subscriptions for membership and these, of course, are particularly welcome. Apart from the financial side the broadcast is known to have done a great deal of good in arousing interest and discussion and in bringing smoke abatement right home to the fireside. We are most grateful to Mr. Julian Huxley for making the broadcast on our behalf and to the B.B.C. for granting us the opportunity.

The cover photograph shows what today is truly one of the sights of London. It is the latest stage in the extensive repairs to the Houses of Parliament, the massive Victoria Tower at the south end of the building. It may be recalled that the " Memorandum on the Defective Condition of the Stonework of the Houses of Parliament and Proposals for its Restoration," presented to Parliament in 1926, estimated that the cost of repairs would amount to £1,062,350, spread over a period of 15 years. The cost in respect to the Victoria Tower alone was estimated to be £135,950. The first expert Committee to inquire into the question of the decay was appointed in 1861 (the building was completed in about 1852) and found that the decay was chiefly due to atmospheric impurities. The Memorandum mentioned above came to the conclusion that decay was due to " (*a*) geological joints and fractures in the stone ; (*b*) the effects of atmospheric impurities resulting from the combustion of raw coal ; (*c*) the corrosion of iron tie rods, dowels, etc., used in the construction ; and (*d*) face bedding, *i.e.*, stone not placed in its natural bed." Smoke is thus looked upon as one of the primary causes of the decay, and there is also little doubt that the other factors would have been less serious if the building had been situated in a clean atmosphere.

The emission of smoke from the open fires of Government Departments in Whitehall and elsewhere has recently come in for some justified criticism. A letter was published in our last issue and in the report of the recent London conference Mr. Keeling's comments will be noted. Alderman David Adams, M.P. for Consett, who is Chairman of the Northumberland and District Regional Smoke Abatement Committee and a member of the Society's Executive Committee, recently asked, in the House of Commons, how many open grates in Government buildings in Greater London burned smoke producing coal ; what total quantity of such coal was annually burned therein, and how soon it was proposed to replace these grates by smokeless methods of heating. In reply, the First Commissioner of Works (Sir Philip Sassoon) said that there were about 12,000 open grates in the Government Buildings in Greater London, which consumed about 15,000 tons of house coal annually. This, he continued, represented 14 per cent. of the total fuel bill, the remainder consisting of smokeless fuels. This remainder is presumably for the central heating of newer buildings, cooking, and so on, but the implication of the reply is that 100 per cent. of the open grates are smoke producing. In view of the expense and trouble caused to the Office of Works by the effects of smoke (see, for instance, the preceding paragraph), not to mention the views of the Ministry of Health and the D.S.I.R. about smoke, it is a matter of astonishment that Whitehall should be so much behind the times.

Since the above paragraph was written Mr. Bernard Shaw in his special broadcast prologue to " The Dark Lady of the Sonnets " referred to these Whitehall offices, " with their old-fashioned grates which make more smoke every morning when the charladies arrive than the whole of the city of Edinburgh." Thank you for a timely thrust, Mr. Shaw ! Let us hope all the Government and H.M.O.W. people were listening and that reception was poor in Edinburgh.

THE INVESTIGATION OF ATMOSPHERIC POLLUTION

THE 1936-37 REPORT

The 22nd Report on the Investigation of Atmospheric Pollution has recently been issued (H.M. Stationery Office, 7/6 net). It deals with observations for the year ended March, 1937.

The report of the Standing Conference of Co-operating Bodies states that there are now in operation 136 deposit gauges, 15 automatic filters, 14 sets of apparatus for determining volumetrically sulphur gases in the air, and 45 sets of apparatus for estimating the " activity " of sulphur in the air by the lead peroxide method. There is a substantial increase in the number of systematic observations, and the installation of several new deposit gauges in districts representative of country air conditions will be particularly valuable for purposes of camparison with more heavily polluted industrial areas.

An important change in the Rules and Standing Orders of the Conference was made during the year. Hitherto they had by implication, if not specifically, limited the scope of discussions at meetings to matters arising from the co-operative arrangements for collating the results of the measurements of atmospheric pollution and for undertaking research into the nature of atmospheric pollution and methods of measuring it. The Conference felt, however, that it should be open to them, within limits, to discuss wider questions, especially that of remedial measures for dealing with atmospheric pollution, even though such discussions might do no more than to afford representatives of local authorities an opportunity of exchanging views with their fellow members. Accordingly the following additional paragraph was adopted at the meeting of the Conference held on 30th November, 1936 :—

> " It shall be competent for the Chairman to allow the Conference to discuss research into remedial measures for dealing with atmospheric pollution or the administrative action to be taken by local authorities in the exercise of their statutory powers and responsibilities. The voting on any such discussion shall be confined to the representatives of local authorities present at the meeting, and the results shall be recorded in the minutes as having been reached on their votes. Before deciding whether to permit discussion on any such matters the Chairman shall submit the question to the vote of the representatives of local authorities present at the meeting."

The Leicester Survey.

The intensive survey at Leicester began in December, 1936, and on 1st April, 1937, it was possible to begin routine observations with most of the apparatus. Dr. A. R. Meetham is the officer-in-charge, and two assistants to him have been provided.

Twelve stations have been selected to cover, as far as practicable, conditions in the centre of the city, on its outskirts, and in the country a short distance outside. At each of these stations there have been set up a combined apparatus for recording suspended impurity and sulphur dioxide (by the volumetric method), a lead peroxide gauge for recording active sulphur gases, and an apparatus of a new design, devised by Dr. Meetham for recording ultra-violet light. In addition, four deposit gauges and four automatic filters are in use at selected points. Included in this apparatus are three deposit gauges, one volumetric sulphur apparatus and six lead peroxide gauges hitherto maintained by the Leicester authorities. Full meteorological data are needed for correlation with the data of pollution obtained ; and this need has been most satisfactorily met by a decision of the Authorities of the City to set up a complete meteorological station, the data from which will be available to the officers of the Survey. In this and many other ways the Department has continued to receive most generous assistance from the City Authorities.

The Deposit Gauge.

A most useful section of the Superintendent's report is a discussion on " the effect of the site of the station and other conditions such as height, exposure, etc., upon recorded observations, and what influence as to surrounding areas may legitimately be drawn from one station."

The various factors involved, such as shelter, height, distance from general and special sources of pollution, wind, configuration of country in vicinity of site, etc., are shown to affect the recorded deposit, and the difficulty of finding the ideal site is also stressed. The gauge may give a perfectly correct figure for the deposit in its immediate neighbourhood, but may not be representative of more than that. " The fact that the pollution recorded at one town is higher than that recorded in another seems sometimes to be held to justify an unqualified statement that the atmosphere in the first town is more heavily polluted than in the other," whereas such an inference may be quite unsound.

The position of the gauge being stressed as a factor of importance, it is very helpful to find that in this report notes have been included describing the site of the stations. These notes enable one to form a much clearer understanding of the figures for any particular station and it is hoped that they will be retained as a permanent feature of all future reports. One example, picked at random, may be quoted to show the nature of the information that is given :

SMOKELESS POWER!

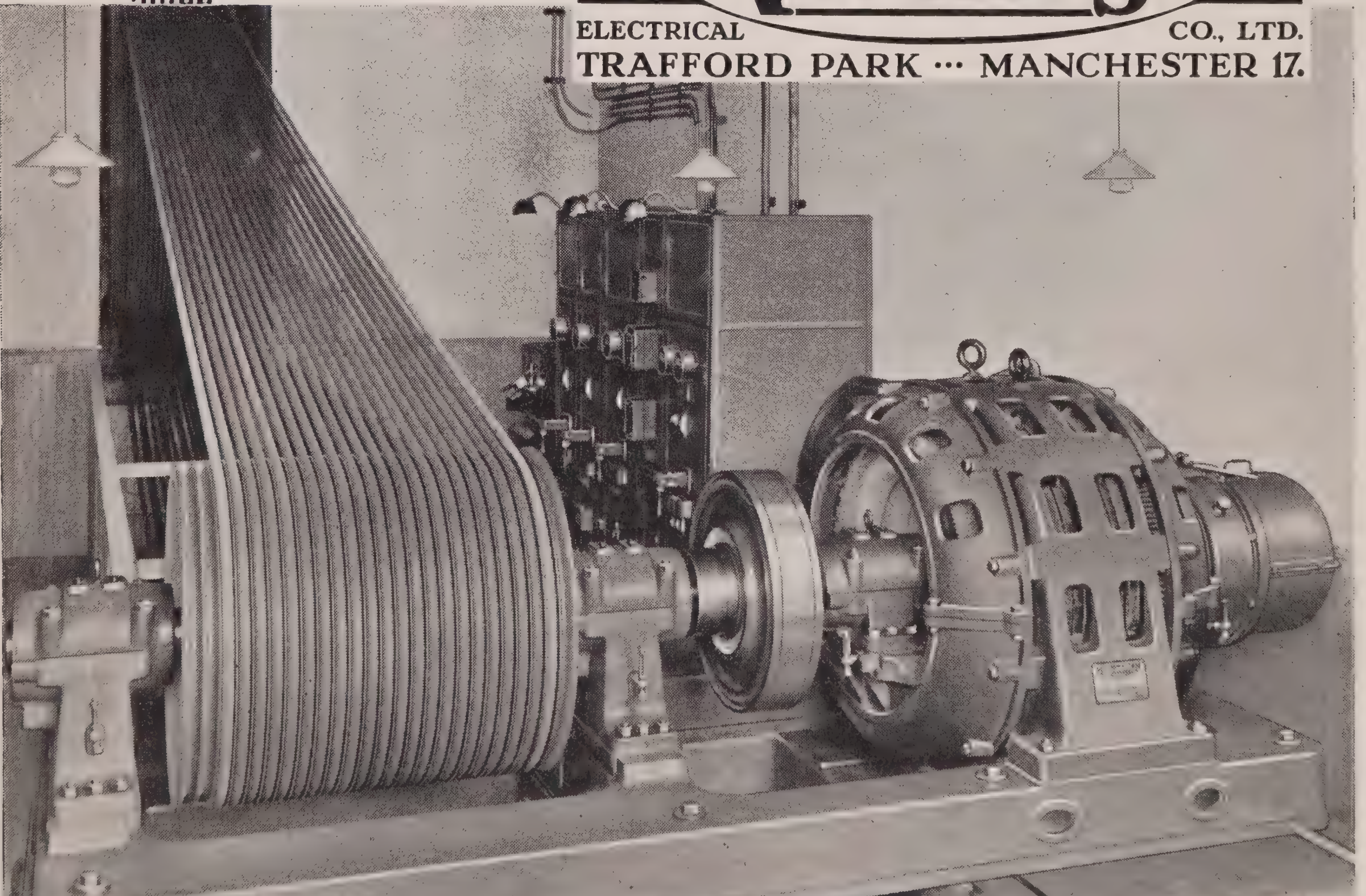
See Stand
E236

EMPIRE
EXHIBITION
SCOTLAND 1938

Below is shown an example of an electric drive in a textile mill — a 400 hp. "Metrovick" slip ring motor driving in group, through a rope pulley, the weaving shed at Messrs. T. & R. Eccles, Darwen

Specify METROVICK for 'CLEAN POWER' Drives

METROPOLITAN Vickers
ELECTRICAL CO., LTD.
TRAFFORD PARK ··· MANCHESTER 17.



C/A705

" Leeds, York Road.

" The gauge is situated in the Vicarage gardens. The church is 25 yards to the north and houses are also 25 yards away. Gravel paths pass near the gauge. It is not screened by trees or shrubs. The gauge stands 182 feet above sea level, 1 mile from the centre of the city, in a densely populated working class district."

Results of the Observations.

The observations for the year do not show any marked change over previous years, and the position may perhaps best be indicated by reference to the adjoining Table I, extracted from the report, which gives the percentage of the stations showing a reduction, an increase, or no change, over their respective " general averages." The general average for any station is in this case its average for the five years ended March, 1932.

It will be seen that for total solids there was a reduction of 10 per cent. or more in the case of 43 per cent. of the stations, compared with an increase in the case of 17 per cent., with 40 per cent. showing no change. The only constituent with more increases than reductions is chlorine, which is of secondary importance and may be derived largely from seaspray. Sulphates show a marked improvement, but the other constituent of importance, tar, shows little difference.

Table II gives the list of stations, with the " total solids " deposit for the year expressed in English tons per square mile. The bold figure in the second column is the percentage of the deposit for the year compared with that station's " general average," where this is available. This is the method that has been used in these pages before, as it appears to be the simplest way of summarizing and making available for easy reference some of the most important figures of the report.

Table I.

	Per cent. of Stations showing a *Reduction* of 10% or more below the General Average		Per cent. of Stations showing an *Increase* of 10% or more above the General Average		Per cent. of Stations *no change*, i.e. between 90% and 110% of the General Average	
	1935-6	1936-7	1935-6	1936-7	1935-6	1936-7
Insoluble matter—						
Tar	41	28	32	25	26	47
Carbonaceous other than Tar	17	39	46	18	37	43
Ash	23	46	31	27	46	27
Soluble matter—						
Loss on Ignition	40	46	23	30	37	24
Ash	57	55	11	18	31	27
Total Solids	33	43	22	17	45	40
Included in Soluble matter—						
Sulphates	61	66	21	12	18	22
Chlorine	30	6	47	56	23	38
Ammonia	68	66	23	19	9	15

Table II.

Ashington, Hirst Park	240	—
Birmingham, Great Charles Street	549	—
West Heath	212	**160**
Bournville, Village	137	**121**
Works	158	**115**
Bradford, Central	302	**80**
North	170	**120**
Bristol, Waterworks	300	—
Zoological Gardens	147	—
Burnley, Bank Hall Hospital	242	—
Marsden Rd. Sanatorium	216	—
Swinton Reservoir	132	—
Town Hall	391	—
Cardiff	182	**101**
Castleford	360	**100**
Coventry, Edgwick	238	—
Greyfriars Green	218	—
Whitley	168	—

SUNCOLE

The New ALL-BRITISH

Smokeless COAL

NO SMOKE

NO SOOT

NO CLINKER

'Suncole' - smokeless coal - every piece 100% burning - no cinders - cannot clinker - easy to light - gives a bright-glowing long-lasting fire - bigger, brighter, and 30% hotter than any other coal.

Equally suitable

FOR OPEN GRATES : KITCHEN RANGES : HOT WATER or CENTRAL HEATING BOILERS

●

COSTS NO MORE THAN ORDINARY COAL BUT GOES TWICE AS FAR

One ton of 'Suncole' is equal in bulk to two tons of coal and goes nearly as far. 'Suncole' never varies. Quick starting - long lasting - smokeless and wasteless. 'Suncole' is the biggest step forward ever taken in smoke abatement.

Obtainable from all the leading fuel merchants

●

Manufactured by

BRITISH COAL DISTILLATION LTD.

ASHBY-DE-LA-ZOUCH

CA 6876

Dewsbury, Gas Works	277	—
Municipal Buildings	336	—
Ravensthorpe	334	**140**
Whitley	196	**161**
Edinburgh, Bruntsfield House	246	**148**
Glencorse	101	—
Leith Links	192	**106**
St. Andrews Square	248	—
Garston (Herts)	160	**106**
Glasgow, Alexandra Park	347	**123**
Bellahouston Park	186	**75**
Botanic Gardens	241	**79**
Glasahoile	139	—
Glasgow Cross	334	—
Glasgow Cross (glass gauge)	422	—
Queen's Park	182	**88**
Richmond Park	295	**98**
Ruchill Hospital	254	—
Ruchill Park	269	**109**
Tollcross Park	214	**71**
Victoria Park	228	**71**
Godalming	85	—
Gloucester	165	**92**
Halifax, Akroyd Park	174	**114**
Infirmary	170	**125**
Wade Street	330	**114**
West View Park	154	**116**
Hove	466	—
Huddersfield, Cooper Bridge	121	**35**
Deighton	242	**61**
Kingston-upon-Hull, Central	318	**90**
Country	108	—
Suburban	95	—
Leeds, Headingley	137	**104**
Hunslet	289	**88**
Park Square	391	**116**
Templenewsam	132	**134**
York Road	324	**102**
Leicester, Humberstone	161	—
Jarvis Street	292	—
Town Hall	320	**92**
Liverpool, Aigburth Vale	160	—
Cambridge Street	368	**119**
St. George's Hall	370	—
Loggerheads (Staffs.)	65	—
London, Archbishop's Park	329	**108**
Battersea Park	253	—
Finsbury Park	278	**109**
Golden Lane	266	**64**
Horseferry Road	490	**138**
Kew Observatory, "N"	119	**98**
Kew Observatory, "S"	129	**98**
Mount Street	320	**109**
Ravenscourt Park	214	**63**
South Kensington (M.O.)	223	**90**
Southwark Park	246	**86**
Victoria Park	214	**100**
Wandsworth Common	175	**93**
Westminster, K. Charles St.	300	**107**
Loughborough, No. 1 Gauge	166	**56**
No. 2 Gauge	149	—
Manchester, Baguley Sanatorium	128	—
Booth Hall	187	—
Heaton Park	156	—
Oldham Road	538	—
Phillips Park	516	—
Withington	157	—
York Place	335	—
Marple	112	**66**
Newcastle-upon-Tyne, Town Moor	257	**104**
Welbeck Reservoir	248	**109**
Westgate Cemetery	277	**72**
Pontefract	272	—
Rochdale, Town Hall	184	**66**
Rothamsted	97	**84**
Rotherham, Oakwood Hall San.	200	**134**
Technical College	374	—
St. Helens	458	**100**
Salford, Drinkwater Park	262	**136**
Ladywell Sanatorium	284	**97**
Peel Park	332	**86**
Sheffield, Attercliffe	367	**121**
Dore	115	—
Ewden Waterworks	119	—
Nether Green	116	**106**
Stocksbridge	252	—
Surrey Street	342	**88**
Shipley, Yorks.	220	—
Skipton	180	—
Southampton	181	—
Southport, Hesketh Park	116	**90**
Stoke-on-Trent, Leek Road	226	**103**
Longton	305	**104**
Tunstall	250	—
Wakefield, Clarence Park	133	**95**
W.R. Rivers Board	342	**121**
Wallsend, The Rectory	202	**105**
Walsall	139	—
Widnes, Isolation Hospital	253	—
Moor Lane	534	—
Wolverhampton	129	—

Suspended Impurity Observations.

The records obtained by the use of the automatic filter are of interest and show considerable variations in the towns where these observations are carried out. Days with a thick smoke haze are recorded, a day being counted as having such a haze when at some time during the 24 hours the automatic filter showed a concentration of four or over on the scale of shades. This is equivalent to 128 milligrams per 100 cubic meters. The haze is thus definitely a smoke haze and is not determined by other factors, such as visibility. For the winter months, 1936-37, the following stations gave the indicated percentage of days showing such a haze, the number of days observed being in each case between 150 and 200 :—

Established 1816

G. N. HADEN & SONS, Ltd.

HEATING & ELECTRICAL ENGINEERS

HEATING (including Patent Panel Systems and Electrical Thermal Storage)
VENTILATION and AIR CONDITIONING
HOT and COLD WATER SUPPLIES. ELECTRIC, GAS and STEAM
COOKING. ELECTRIC LIGHT & POWER PLANTS. LAUNDRY PLANTS
AUTOMATIC OIL FUEL BURNERS. AUTOMATIC HARD FUEL STOKERS
PLUMBING and SANITARY WORK

SMOKELESS and ECONOMICAL COMBUSTION
ENSURED WITH A **HADEN** INSTALLATION

Head Office, 60 KINGSWAY,
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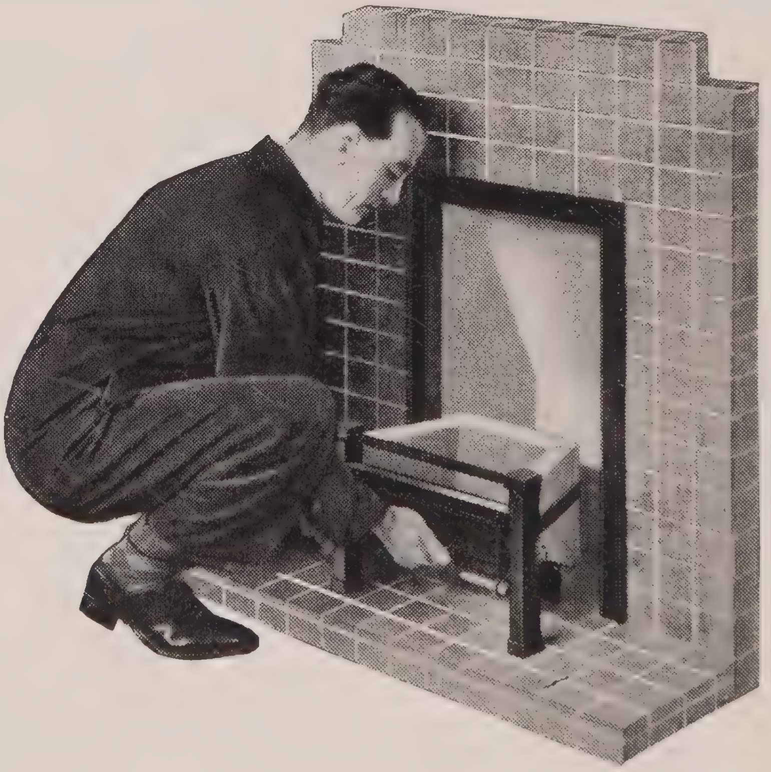
Telephone—
HOLBORN 7800 (10 lines)

Telegrams—
WARMTH, WESTCENT, LONDON

Fully Equipped branches at—
MANCHESTER, BIRMINGHAM, GLASGOW, DUBLIN, BRISTOL, BOURNEMOUTH, TORQUAY, LINCOLN, EASTBOURNE, CANTERBURY. Works—TROWBRIDGE.

Install a
METRO
Coke Fire
and banish
Smoke and Soot



The room that has a Metro Coke Fire installed is a cosy room, a clean room, and the cost of fuel is reduced to 4d. or 5d. per day. Decorations and furnishings retain their freshness. Laborious fire laying and chimney sweeping are abolished. Insist upon the genuine Metro Grate—the original and successful fire. In many attractive designs suitable for modern or period decorations. See them at the Welbeck St. Fireplace Galleries, 38 Welbeck St., London, W.1.

Obtainable from all Gas Companies, Stores and Ironmongers, or write direct to SIDNEY FLAVEL & CO. LTD., Leamington, the Manufacturers and Distributors of the "Metro" Coke Fire for the South Metropolitan Gas Company.

South Kensington	8
Victoria Street	55
Westminster Bridge	12
Westminster City Hall	55
Cardiff	0
Coventry	6
Edinburgh	44
Greenwich	42
Kew Observatory	3
Kingston-upon-Hull	12
Stoke-on-Trent	66
Glasgow, average for 5 Stations	11

The contrast between New and Victoria Street or Westminster City Hall (Charing Cross Road) is very marked indeed, especially as climatic conditions must be very similar. Cardiff occupies a proud position with no days of thick smoke haze. In Stoke, on the other hand, exactly two days out of every three during the six winter months were classified as hazy.

Coal Utilisation Research.

It is announced that a new research association which will study the economic utilisation of coal has been set up, called the British Coal Utilisation Research Association. It will have an assured income of between £25,000 and £30,000 per year for five years, to which the Government are giving a grant.

THINGS SAID

The Work of the Society.

If our ancestors were right in regarding the production of coal smoke as a crime, then we are a nation of criminals for it is generally accepted that the open fire in the ordinary household grate is responsible for the bulk of atmospheric pollution in our towns.

A well-informed public opinion is a condition precedent to any real advances in the fight against smoke. The National Smoke Abatement Society has done a great deal of valuable educative work.

It has collected from well-known authorities a mass of evidence as to the causes and effects of the smoke nuisance, and has set out to stir the public conscience by means of articles, lectures, exhibitions, and other forms of propaganda. It is largely owing to the Society's efforts that our newspapers today are beginning to treat the subject as an issue of vital importance to every citizen.—*Sir Philip Dawson, M.A., M.P., President of the Institute of Fuel.*

High Amongst Important Problems.

Smoke is in fact a central and dominating problem of our industry, and one is surprised that it should receive so little attention. Thus I should have imagined that no experiment in steam-raising could be considered completed until meticulously related to smoke emission; yet in thirty pages of report (the Fuel Research Board Report) on this subject there is only one incidental reference to smoke. In both branches there is still ample scope for further inquiry; I should place the smoke question high amongst important problems still unsolved —next, in fact, to research into the safety of life and limb."—*Lord Crawford and Balcarres, in a Presidential Address to the Manchester Geological and Mining Society.*

3,250,000 Tons of Fuel Wasted.

In the hearths of the country we are burning every year some 40,000,000 tons of coal and two-and-a-half million tons of soot come into the atmosphere, doing untold damage to our health and vegetation. From industrial chimneys there pour out about 800,000 tons of soot each year, making in all some three-and-a-quarter million tons of solid fuel coming back to us because of our inefficient means of burning coal."—*Sir Frank Smith, secretary of the Department of Scientific and Industrial Research, at the annual luncheon of the Combustion Appliance Makers' Association.*

Medical Practitioners and the Society.

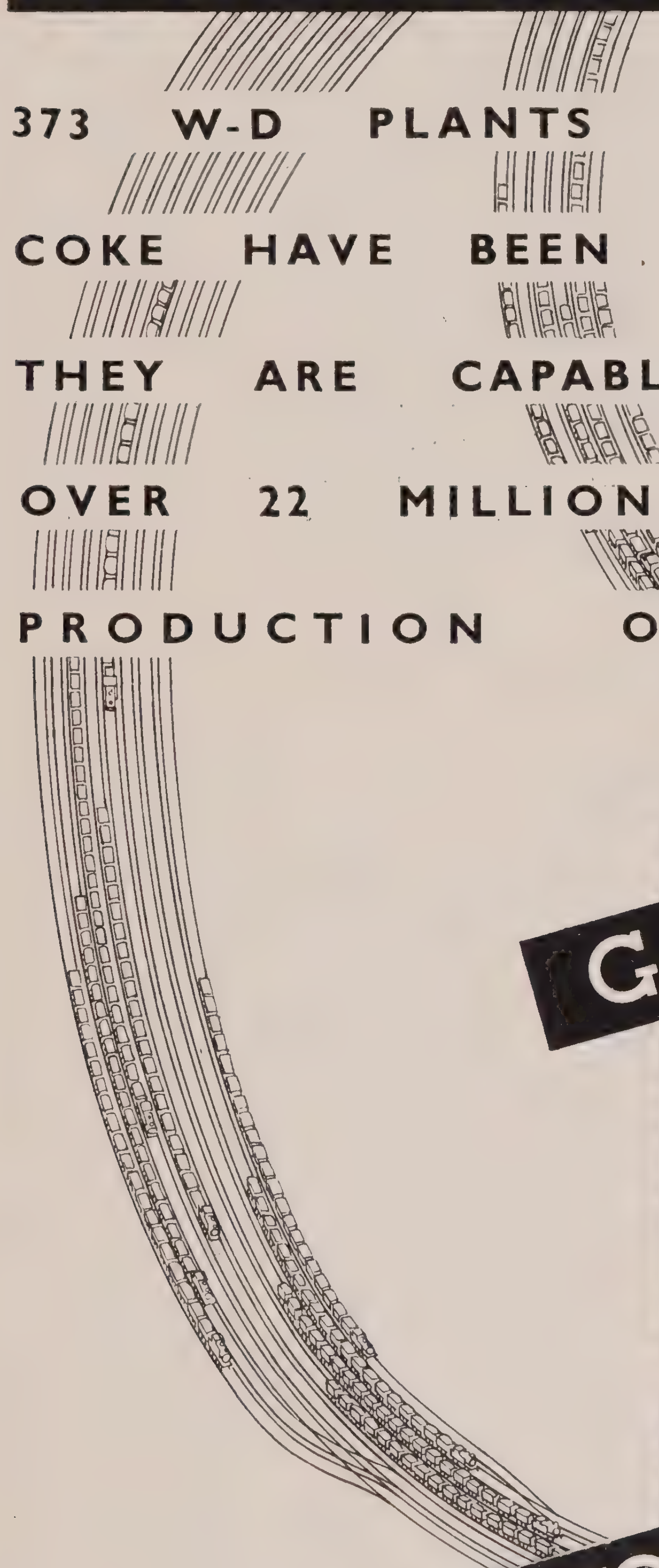
Reviewing the 8th Annual Report of the National Smoke Abatement Society: The total amount of subscriptions and donations to the Society for the year under review is again only a little over a thousand pounds, an insignificant figure in view of the scope and importance of the Society's work. Medical practitioners in urban or industrial areas suffer more severely than most classes of the community from the incidence of fogs through the dislocation of their transport, the burden of a heavy increase in the number of cases of respiratory diseases on their visiting lists, and the greater risk to their own health. It is to their direct interest to support the Society, for they will derive special benefits from the results of its activities.—*Editorial in "The British Medical Journal."*

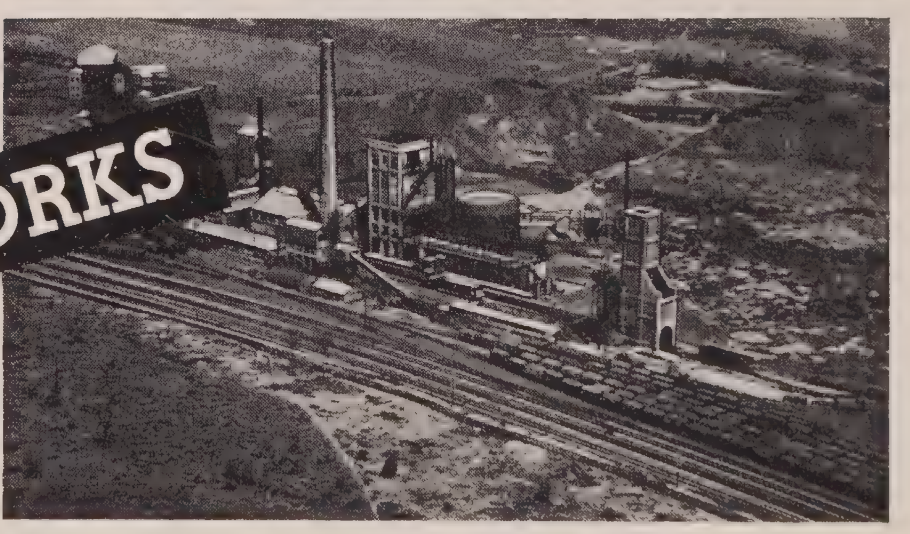
Smoke and Physical Fitness.

The National Smoke Abatement Society is continuing its campaign against the smoke nuisance. Even so, a substantial improvement is a long way off if it depends on voluntary action. Surely the facts warrant stronger measures . . . . Nothing could be more apparent than that any attempt to make the nation physically fit would be handicapped from the start by a polluted atmosphere. An authoritative statement is overdue as to the weight of this handicap, although it is known to be at its maximum in densely populated places.—*Editorial in "Contractor's Record and Municipal Engineering."*

OUR IDEAL–A SMOKELESS CITY

373 W-D PLANTS FOR PRODUCING GAS & COKE HAVE BEEN BUILT IN 24 COUNTRIES. THEY ARE CAPABLE OF TREATING YEARLY OVER 22 MILLION TONS OF COAL, FOR PRODUCTION OF SMOKELESS FUEL





W-D

THE WOODALL-DUCKHAM VERTICAL RETORT & OVEN CONSTRUCTION CO. (1920) LTD.
EBURY AND ALLINGTON HOUSES, 136-150 VICTORIA STREET, LONDON, S.W.1

Telegrams : "Retortical, Sowest, London."
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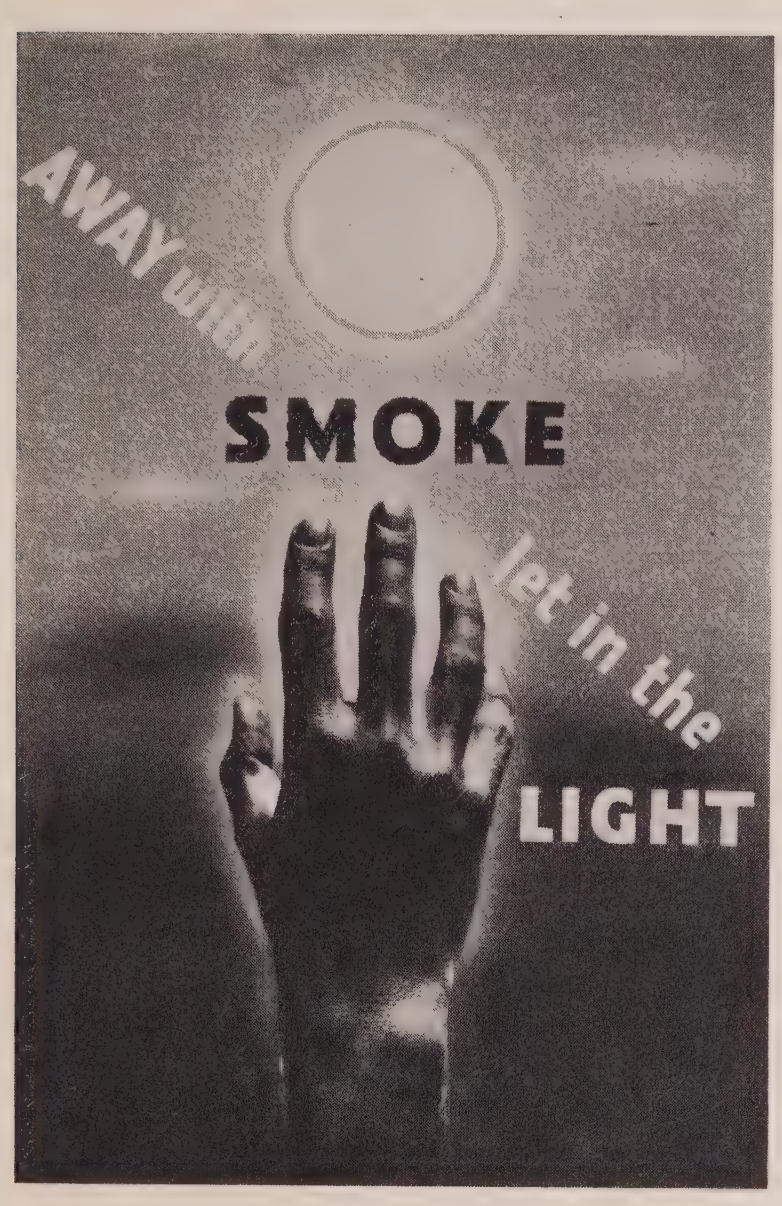
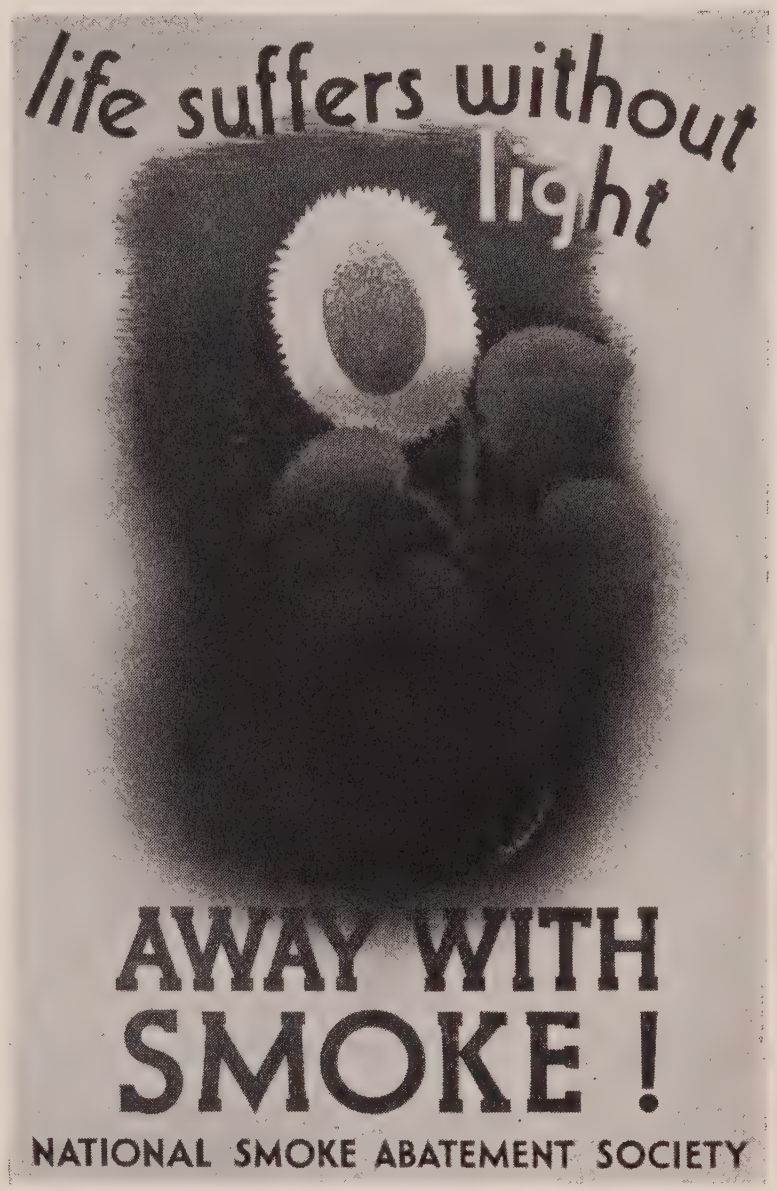


FIRST PRIZE—by Henry W. Collins, London.



SECOND PRIZE—by P. V. Chadwick, Braintree, Essex.

THE POSTER COMPETITION

The poster Competition arranged by the Society, for which the judges were Sir Lawrence Chubb and Mr. E. McKnight Kauffer, attracted much more interest than had been anticipated. Over 250 entries were received and the few days before the closing date saw the Society's offices overwhelmed by posters and their packings. The conditions of the competition had asked for a poster illustrating one of three given slogans, although it was stated that the wording might be altered if desired. One marked feature of the majority of the entries was the way in which the idea behind the Society's appeal was grasped, even though the expression of this naturally took many diverse forms. The technique of most of the entries was surprisingly good, although a great many failed, in one respect or another, to convey their message in a convincing or readily appreciated way.

Judging was a lengthy and difficult task, but finally the two principal prizewinners, which are reproduced above, were selected. The first prize was £10, and the second £5. In addition five prizes of £1 each were awarded to: E. Knight Bernard (West Ewell, Surrey), H. J. Greensmith (London), W. McLauchlan (Glasgow), F. Stalker Miller (London), and R. T. Whitworth (Hull).

The winning posters and about forty of those specially commended were exhibited from 6th April until Easter at the Housing Centre, Suffolk Street. The exhibition was opened by Dr. H. A. Des Voeux, with Sir Raymond Unwin presiding. Sir Lawrence Chubb spoke in his capacity of one of the judges, and Sir Arthur Hill, Director of the Royal Botanic Gardens, Kew, made a short contribution. The function was attended by about seventy people, mainly members of the Housing Centre and of the Society, and competitors. Our thanks were expressed to the Housing Centre for their kind permission to arrange this exhibition on their premises.

Entries were received from all parts of the country from students, amateurs, and professional artists. Many were received together from various Schools of Art, including those at Birmingham, Bournemouth, Dublin, Glasgow and Sheffield.

It is hoped that before long it will be possible to reproduce the winning entry, and perhaps others, for use at schools, exhibitions, and meetings.

"MORAL EFFECT"

Battery of Lancashire Boilers at a Public Institution in Lancashire. All the Hodgkinson Stokers are fitted with Lea Coal Meters.

Apart from the great advantage of checking the amount of Coal burnt by each Boiler :—

The "Moral Effect" of Lea Coal Meters, in any Boiler House, cannot be over estimated.

Full particulars of these useful Meters, with Lists of Users, etc., sent on request to :—

THE LEA RECORDER CO. LTD.
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London Office Parliament Mansions
Victoria St., S.W.1. Tel. Abbey 4079

ESSE FAIRY FUEL IS ANTHRACITE

With all the advantages of larger ESSE Cookers, the ESSE FAIRY is now available for homes with or without a maid. Continuous-burning day and night, this compact cooker is always ready for early and late demands. Cooking by indirect (stored) heat, the ESSE uses solid smokeless fuel—preferably anthracite. Quick, economical, convenient and spotlessly clean in action, the ESSE FAIRY is just the cooker you have been waiting for. Come and see how different and how desirable it is ; how well it cooks ; how little it costs to run ; how like your dream cooker is the ESSE FAIRY. Prices from £32, delivered, or Hire Purchase Terms from less than 7d. a day. Write for booklet EY. 38.

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"STEER'S LAW OF SMOKE NUISANCES"

By CHARLES GANDY

In a review, published in this *Journal* in Autumn, 1934, of the late Mr. Randolph A. Glen's Treatise on the Law relating to Smoke and Noxious Mumes, I suggested that it would be interesting, when a second edition was published, to see how much had been added. I did not then anticipate that a second edition would be needed in less than four years, nor that it would be found to contain so much that is new and important, both to the general student of smoke abatement and more particularly to those requiring a handy book of reference on this branch of the law. The need for a new edition arose from the fact that the provisions with regard to nuisances under the Public Health Act 1875 and the Public Health (Smoke Abatement) Act 1926, and the corresponding provisions in the Acts relating specifically to the London area, to which references are made in Mr. Glen's treatise, were repealed and re-enacted in consolidated form by the Public Health Act 1936 and, in regard to London, by the Public Health (London) Act 1936. Mr. W. R. Hornby Steer, who has succeeded Mr. Glen as Standing Counsel to the Society, and who kindly undertook the revision, has made full use of the opportunity for enlarging the scope of the original treatise, which he has prefaced with a most interesting chapter on the history of the smoke nuisance and the progressive efforts made for its abatement, including a reference to the origin and work of the National Smoke Abatement Society and of the Atmospheric Pollution Committee of the Department of Scientific and Industrial Research. Other new features of the present edition, better printed and produced than its predecessor and containing a total of over 64 pages as against the previous 24, include a contents page and index, as well as the Tables of Statutes and cases familiar in legal text books, and also a very valuable appendix in which the author has collected the relevant statutory provisions and some model bye-laws. The chapters of the greatest practical value relating to the law at present enforceable in respect of smoke from trade premises have been completely recast. They now contain not only a clear statement of the law with all necessary references, but a simple and very valuable guide to its practical administration which will be of the greatest service to members and officers of Local Authorities and to Magistrates and others, as well as to the practising lawyer. Indeed, these portions of the book will make it indispensable to all who are actively concerned in the prevention of smoke nuisances. London, with its own body of law under the Public Health (London) Act 1936 is the subject of a separate chapter. Further chapters deal separately with Shipping, Railways, and Vehicles, and a short chapter has been added on the important topic of Joint Action, including the formation of Regional Committees.

The author refers to the unsatisfactory state of the law which has resulted in several Municipal Corporations obtaining special powers in local acts. This has been done in Manchester, Sheffield, Nottingham, Leeds, Bradford and elsewhere. The law relating to smoke from private dwellinghouses, which in the aggregate exceeds the smoke from all other sources, is perforce dealt with in a short chapter, since all the statutes exclude such premises from their provisions. Having regard to the inadequacy of present substitutes for raw coal it would no doubt be unreasonable to expect any general legislation to include them. The position, however, in regard to factory smoke, and to smoke from that large intermediate class of buildings, which are neither factories nor private dwellinghouses, is still unsatisfactory. Under S.101 of the 1936 Act smoke nuisances are divided into two classes, viz. (*a*) any installation for the combustion of fuel which is used in any manufacturing or trade process or for working engines by steam, and which does not, so far as practicable, prevent the emission of smoke to the atmosphere; and (*b*) any chimney (not being the chimney of a private house) emitting smoke in such quantity as to be a nuisance. The wording of (*b*) is on the face of it wider than that of the repealed S.91 (*b*) of the Public Health Act 1875 which it replaces, in which the words were "any chimney (not being the chimney of a private dwellinghouse) sending forth *black* smoke in such quantity as to be a nuisance." Further the new Act provides by S.104 (1) that a Local Authority may, and if so required by the Minister shall, make bye-laws regulating the emission of smoke of such colour, density or content as may be prescribed by the bye-laws. Unfortunately the apparent extension under the powers of the new Act to deal with smoke, other than black smoke, has been largely nullified by the difficulty which has been experienced in framing such bye-laws. The model bye-laws included in the appendix to Mr. Steer's book refer only to the emission of black smoke, and so far as I am aware no authority has been successful in producing a bye-law covering smoke which cannot be described as black. A similar difficulty has also been experienced in regard to S.104 (2) of the Act (replacing S.5 of the Act of 1926) which provides that "building bye-laws may require the provision in new buildings, other than private houses, of such arrangements for heating or cooking as are calculated to prevent or reduce the emission of smoke." As Mr. Steer points out on page 27 the opinion of the Ministry appears to be that the scope of the bye-laws last referred to must be limited to matters relating to the construction of the appliances. He makes the useful suggestions that a bye-law requiring that boiler plant provided for the heating

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of a building must be adequate for the peak load, if drafted in terms of reasonable precision, or a bye-law enforcing specific requirements of the particular authority concerned for the purpose of preventing or reducing the emission of smoke in open grates in new buildings, would be reasonable and within the powers of the section. The fact that the bye-laws section has been so far useless indicates, however, that the whole matter requires further consideration, and that it may be necessary to recast the section when an amending Act is drafted. In regard to the intermediate class of buildings above referred to, *i.e.*, buildings other than private houses, the difficulty is largely one of observation. It is comparatively easy for a Smoke Inspector to observe the single large factory chimney and to give the appropriate warning when it is transgressing. It is a much more difficult matter to trace the culprit when one of the chimneys, say in a large block of offices, is causing the nuisance. Probably the simplest and most effective method in regard to such buildings, especially in city centres where the smoking coal fire is really an anachronism, would be to make the mere emission of smoke the statutory smoke nuisance, in which case it would always be a good defence for the defendant to prove that the best practicable means had been taken for preventing the nuisance having regard to cost and to local conditions and circumstances. It is hoped that some advance on these lines may be made through the initiative of some of the more progressive Local Authorities. We shall look forward to a third edition in which the law to be stated will have been placed on a more satisfactory basis. Meanwhile, Mr. Steer has deserved the thanks and congratulations of the growing number of those who are actively concerned in the gradual abolition of the smoke nuisance, as well as of the general public who are now following their efforts with sympathy and approval.

REGIONAL COMMITTEE NEWS

Manchester and District Committee.

At the last meeting of the Executive Committee the Chairman (Alderman W. T. Jackson), said that in view of the number of Local Authorities who had now promised to support the Joint Board, he thought the time had come when some more definite steps should be taken with regard to the formation of the Board. He suggested that a Conference should be arranged of the Authorities who had agreed to join, to be followed by another conference of all the affiliated Authorities.

The Honorary Secretary (Dr. R. Veitch Clark) stated that the method of procedure would be as follows: A conference would be held of representatives of the Authorities who had agreed to join, their decision would be submitted to a further meeting of the Executive Committee, from which a resolution would go forward to a meeting of the full Regional Committee, recommending that the necessary steps be taken to form a Board of those areas and any other areas willing to join. If that resolution was carried an application would be made direct to the Minister of Health for a provisional Order constituting a Joint Board.

It was agreed that a meeting of the Authorities who had agreed to join should be called.

The Midlands Joint Council.

At the last quarterly meeting of the Executive Committee the Honorary Secretary (Dr. W. R. Martine, Birmingham) reported an increase of nine subscribing members since the last meeting.

It was also reported that some 40-50 students were attending a course of Lectures by Dr. Martine and Mr. Farquharson at the Birmingham Central Technical College with a view to qualifying for the Smoke Inspector's Certificate of the Royal Sanitary Institute.

The attention of the Committee was drawn to the broadcast appeal by Mr. Julian Huxley on Sunday, 6th February. It was resolved to ask a representative of the Coal Utilisation Council to address the full Council at the next meeting on 28th April, 1938.

Sheffield, Rotherham and District Committee.

There has been a lull in trade conditions during the past month, but this is only regarded as temporary and was to some extent anticipated. Reconstruction work is still going forward, but not as quickly as had been hoped for and the present rate of progress is far from satisfactory.

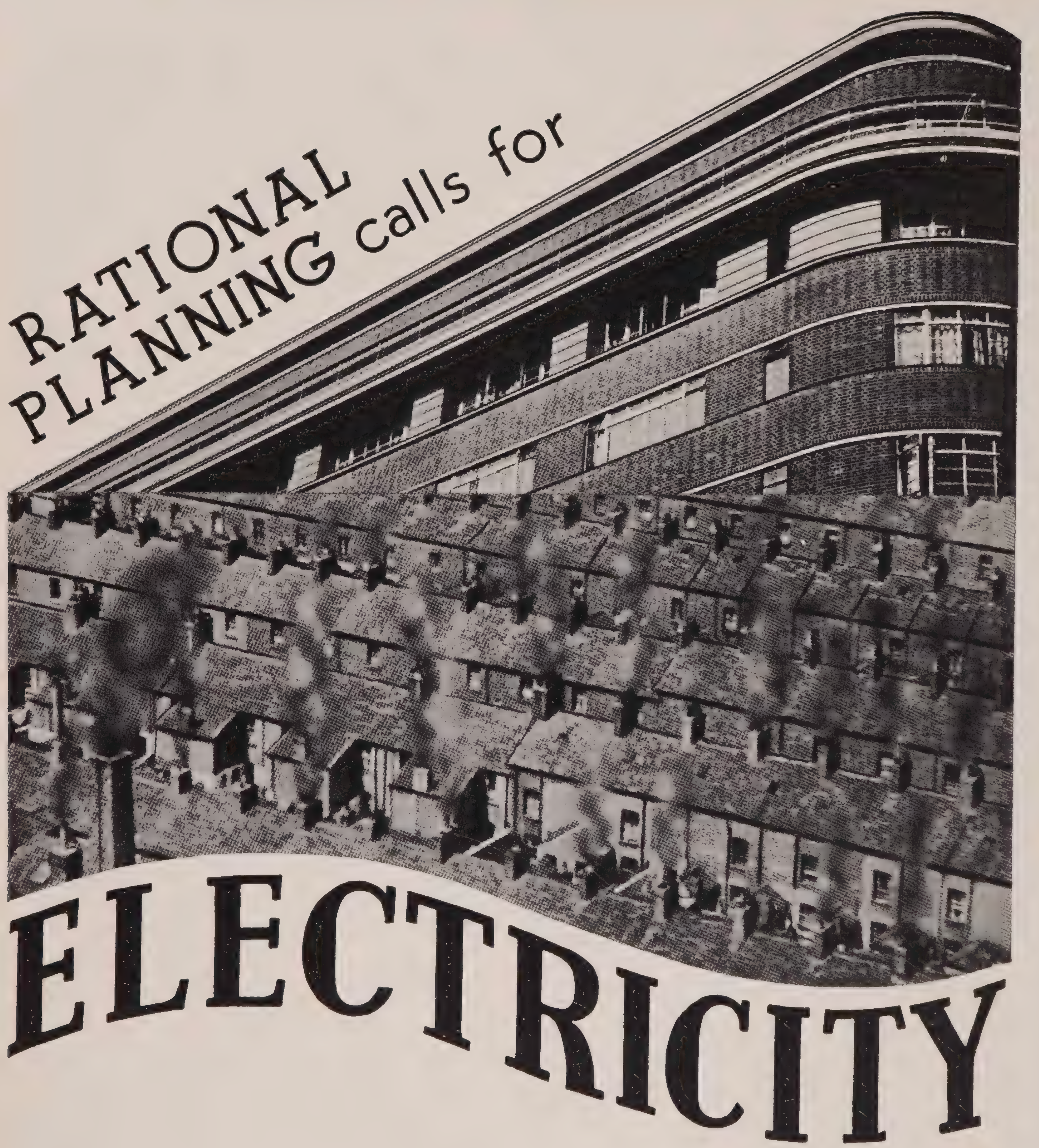
Combination and Furnace Chimneys. As has been previously stated, the principal cause of pollution in this area is due to excessive smoke emitted from Combination and Furnace chimneys—a Combination chimney carries the products of combustion from boilers and metallurgical furnaces, whilst a Furnace chimney serves metallurgical processes only.

On December 7th, 1937, an important meeting of the Statutory Committee and the Manufacturers' Committee took place and the difficulties experienced with regard to nuisances caused by these chimneys were discussed.

Statements had been made that most of the smoke emitted could be attributed to the smaller works and light industries, but observations showed that many of the heavy industries emitted smoke for more prolonged periods than did the light industries.

On behalf of the Manufacturers it was stated that they admitted there were a number of chimneys which emitted smoke in such quantity as to be a nuisance, but that many of the works to which these chimneys belonged had been considering how it was possible to abate the nuisance. The preparation of schemes for improvement depended on an amount of investigation over a lengthy

RATIONAL PLANNING calls for



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period and when a scheme had been adopted a further period must elapse before the new plant could be obtained and the work completed.

It was further stated that the expenditure of some of the manufacturers had been very heavy and that the expenditure yet to be incurred would amount to a very large sum. The delay in carrying out these schemes was due in a measure to the National Defence Programme which had held up the manufacture and delivery of the new plant.

Any information with regard to the preparation of these schemes was not generally known to the Works Engineer or other representative of the manufacturers who interviewed the Chief Smoke Inspector.

The Chairman, Councillor W. Asbury, stated that while in the past it had appeared to him that there had been a reduction of smoke, judging by the present amount of pollution, due to the increase of trade during the past two years, such improvement was more apparent than real. It would seem that the manufacturers were not taking the steps they should to reduce this pollution.

In the past, when pressure was brought to bear, the firms stated that they were not in a financial position to carry out reconstruction work and now that they were prosperous, they had not time to do the work. In his opinion the present atmospheric pollution was appalling.

Whilst he appreciated the steps which the representatives stated their individual firms had taken or were taking, he was very much concerned with the fact that this did not apply to many of the other firms who were not represented.

It was eventually agreed :—

1. That arrangements should be made by the Manufacturers' Committee for the Chief Technical Adviser of the Iron and Steel Federation to visit Sheffield, confer with the Chief Smoke Inspector and visit several of the works.
2. That subsequently he should return to Sheffield, visit all the works concerned, investigate the conditions and make a special report with recommendations.
3. That a copy of this report should be issued to the Statutory Committee as well as to the Manufacturers' Committee.

Research Work. A request had been made by Professor R. V. Wheeler for an additional assistant to be appointed in order to expedite the work being carried out by the investigator—Dr. Thompson—and the manufacturers were asked to consider increasing the amount granted each year to carry out this work. The Chairman of the Manufacturers' Committee intimated that from September 1st, 1937, such increase would be granted and that the Iron and Steel Federation would contribute a similar sum for this purpose. The University of Sheffield have accordingly made the additional appointment. The total estimated expenditure on research for the year ending September 1938 is £500 against that of £326 for the previous year.

Classes for Stokers and Furnacemen. Efficiency classes have been continued at Sheffield, Rotherham and Worksop during the winter months, but the number of students is small in comparison to the total number engaged in this work. With the older men there is some excuse to be made on account of lack of education, but that does not apply to the younger men. Aa s sign of progress made it has been noted that when vacancies occur at certain works, men with the City and Guilds Certificate are asked for and given preference.

West Lancashire and Cheshire Committee.

At the invitation of the Liverpool Gas Company, a meeting of the Executive Committee of the West Lancashire and Cheshire Regional Smoke Abatement Committee was held in their new premises Radiant House, Bold Street, Liverpool on April 4th last.

The Hon. Secretary (Dr. W. M. Frazer, M.O.H. Liverpool) informed the Committee that an 'Owens Automatic Air Filter' had recently been purchased by the Liverpool Health Committee and installed in Liverpool. The working of this instrument was explained and it was noted that the records so far obtained indicate clearly the fluctuating character of local air pollution.

It was reported by several members that efforts are being made to influence their respective local authorities to adopt a byelaw for black smoke so that the control of industrial smoke shall be uniform within the area of the Committee as far as possible.

After the meeting, three films were shown to members of the Committee illustrating the damage done to buildings by smoke and a contribution towards solving the problem of domestic smoke by the installation of gas appliances for all purposes of heating and lighting in new model flats. An inspection of Radiant House followed where various domestic appliances using gas and smokeless fuel were demonstrated.

They Wanted Pure Air.

In February last three 15-year-old Salford schoolboys set out one morning ostensibly for school, but caught the Lakes Express from Manchester and arrived at Cockermouth early in the evening. The night was spent in a bracken shed and the following night in a cave on the Lanthwaite Green shore of Crummock Water. They were discovered by a police officer and spent the remainder of the day at Cockermouth Police Station, awaiting the arrival of their parents. Interviewed by a " Lancashire Daily Post " reporter the boys said : " We wanted to get away from the dirt and smoke of Manchester and to breathe pure air again. We have been to the Lake District for our summer holidays and know and like the country well. We felt we had to get away from it all."

HEALTH RESORT

AT BUXTON, as at all resorts similarly given over to the promotion of good health, purity of atmosphere amounts to stock-in-trade. In the choice of modernized gas works equipment a very big factor was the necessity for smoke-free operation. And, as at many other health centres, the chosen carbonizing plant was an installation of

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THE SMOKE PROBLEM OF GREATER LONDON

A PROPOSED REGIONAL COMMITTEE

A most successful conference of Greater London Local Authorities, convened by the Society, was held in the County Hall, Westminster Bridge, on Friday, 25th February, 1938. The Rt. Hon. Lord Snell, Chairman of the London County Council, was in the Chair. All Local Authorities in the Greater London area had been invited, and representatives to attend were appointed by the County Councils of London, Essex and Middlesex, the Cities of London and Westminster, 24 Metropolitan Boroughs, 20 other Boroughs, and 9 Urban Districts. The Minister of Health was represented by Mr. W. A. Damon, Chief Inspector of Alkali, etc., Works.

The chief speakers were Dr. J. S. Owens, Mr. E. H. Keeling, M.P., Mr. W. A. Damon, and Mr. W. R. Hornby Steer. After the opening paper by Dr. Owens, on the present position and trends of atmospheric pollution in Greater London, Mr. Keeling spoke and proposed the following resolution :

> "That this meeting is of the opinion that steps should be taken to promote the formation of an Advisory Regional Smoke Abatement Committee for London and Greater London and requests the National Smoke Abatement Society to report to the Authorities concerned, asking them to agree in principle to the proposal, and to be represented at a further meeting to be convened for the purpose of establishing such a Committee."

The resolution was seconded by Mr. W. R. Hornby Steer, and after a short discussion in which Councillor Mrs. Alderson Horne, Sir David Milne-Watson, Alderman C. W. Daines, C.C., Councillor T. Turner, and Councillor the Rev. E. Burgess, took part, it was put to the meeting by Dr. H. A. Des Voeux (who took the Chair upon the retirement of Lord Snell from the meeting) and was unanimously carried.

Pollution in Greater London.

Dr. Owens, for his very informative paper, prepared a number of tables of the records obtained by the measurement of atmospheric pollution in the area. The first of these showed the totals for 1936-37 of solids, sulphates, and tar. These range from a total deposit of 322 tons per square mile at Archbishop's Park to 172 tons at Wandsworth Common. The deposit of sulphates lies between 53 tons per square mile at Finsbury Park and 22 tons at Wandsworth Common, while tar ranges from 7 tons per square mile at Golden Lane to 2 tons at Wandsworth Common.

When we look, continued Dr. Owens, at the suspended impurity, that is the black sooty matter which one breathes in London, and consider the winter of 1936-37 and the concentration in milligrams per 100 cubic metres, we find that at Victoria Street the highest concentration was found, that is 69, the next was at Westminster City Hall with 65, Westminster Bridge County Hall 38, and South Kensington 31. A little further west, at Kew, it had dropped to 15. The quantity is comparatively small looked at in one way, but when we remember that it is this suspended matter which obscures the light, produces smoke fogs and blackens the lungs of city dwellers, it takes on a different importance and, owing to the excessively small size of the particles, that is an average of about 1/40,000 of an inch, a small quantity distributed through the atmosphere has a great effect, and further, the small size allows the suspended matter to penetrate almost anywhere air can enter.

To give an idea of how this compares with other cities, the average of the five London stations during the winter 1936-37 was 44, the average for five Glasgow stations for the same period was 63, and for one station at Stoke 85.

Sulphur.

During 1936-37 the average concentration of sulphur dioxide in the air of London as taken from three stations was 0.109, which compares with an average of 0.096 for Glasgow and 0.148 for Sheffield for the same period. The activity of the sulphur is a measure of the rate of attack on building stones and exposed metal work, and this during 1936-37 averaged for seven London stations 3.81 mgms./100 sq. cm. per day compared with 2.65 for Glasgow, 2.07 for Sheffield and 4.65 for Salford. It will be seen from the figures given that there is room for improvement in the condition of the air of London and, when dealing with the trend or the rate of improvement observable in London, it will be evident that some greater effort than we have been making in the past is required to purify the air.

Comparison with Past Years.

Dr. Owens referred to the following table :—

The inference we may draw from this table is that for some reason, probably that the easiest things were done first, there was a very rapid improvement after the commencement of observations, but we appear to have been almost at a standstill for the last 15 or 16 years, with some deterioration from the sulphur pollution point of view. This is not a very satisfactory condition and shows that our efforts to clean the air should not be relaxed.

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	Deposit in Tons per Square Mile (Annual Total)		
	Total Solids	Sulphates	Tar
1915-16	415	72	4
1916-17	400	68	4
1917-18	379	60	3
1918-19	372	70	3
1919-20	346	53	3
1920-21	307	27	5
1921-22	284	25	5
1922-23	302	36	3
1923-24	288	33	2
1924-25	319	41	3
1925-26	264	32	3
1926-27	303	40	4
1927-28	316	30	4
1928-29	255	29	4
1929-30	272	35	4
1930-31	289	41	4
1931-32	281	41	4
1932-33	272	41	4
1933-34	315	45	5
1934-35	298	49	5
1935-36	284	43	4
1936-37	238	34	4

This discloses a somewhat curious state of affairs. In 1915-16 the total deposit from the air amounted to 415 tons per square mile, the sulphates deposited were 72 and the tar 4. There was a rapid improvement until 1921-22 when the total deposit fell to 284 tons, sulphates to 25, while tar had increased to 5. Looking now at the total deposit of impurity we find little change between 1922 and 1936, in fact the amount recorded in these two years was exactly the same, that is 284 tons per square mile. There were variations in the interval between, but nothing very great. Sulphates show that there was an actual increase as between 1921-22 and 1936-37, while tar had altered very little, if anything a slight reduction.

Dr. Owens continued by referring to the records of suspended matter, which again showed only slight improvements, if any. In the case of Westminster Bridge (County Hall) there is a little improvement, but Victoria Street shown no appreciable change; in fact for 1936-37 it gave a higher figure than in 1923-24, the first available year. The number of days showing thick smoke haze had fallen a little during the last few years at all stations, but whether this was a meteorological effect or due to reducing smoke was not certain.

Mr. Keeling's Address.

Mr. E. H. Keeling, M.C., M.P., was the next speaker. He said:

Almost the first step of the National Smoke Abatement Society, on moving its office from Manchester to London, was to call this conference on smoke abatement in Greater London. Now I am not sure whether the removal from Manchester last year was a compliment to London or an insult, but at any rate I should like to congratulate the Society on taking such early steps to get down to business in its new home. It is what we should have expected from a body which has already done much for smoke abatement.

Nobody who lives in London, nobody who visits London in winter, even if he comes from Manchester, can doubt the crying need for further action. Smoke is bad for health. It is possible to exaggerate its potency in causing actual disease, though that may be considerable, but can any one doubt that if Londoners could all breathe a pure atmosphere, could all see the sun shining at times when its rays are withheld, not by God but by the action of man, the effect on their physique, energy and cheerfulness would be as great an advantage to the nation as the improvement of a few by physical training? The air we breathe ought to be as pure as the water we drink. And what of the effect of smoke on vegetation? 500 years ago, as we all learnt at school, roses both white and red grew in the Temple. They do not grown there now. Consider also the immense material saving to be made. Vast sums are spent in London on cleaning away the pollution, and on repairing the damage caused by smoke. Is it not good business to try and remove the cause of this damage?

We are sometimes told that the smoke problem in London is getting smaller every year, and will in time solve itself. As Dr. Owens told you, the figures do not bear out that contention. I happen to work at the Air Ministry, which is, as you know, the office of the Director of Meteorological Observation, otherwise known as the Clerk of the Weather, Sir George Simpson. Sir George has got out some figures for me which show that 50 years ago the pollution did begin to get less, but about 15 years ago progress stopped. In the ten years ending in 1890 Central London had only one-third of the winter sunshine enjoyed at Kew. By 1920 the proportion had improved to half. And to-day it is still only half. Sir George added with a touch of pride that he was not responsible for the stagnation, for he has not a single coal fire in his own house!

Dr. Owens drew an illuminating comparison (if that adjective is not out of place) between London and other British cities. He showed that the air breathed by Londoners is as much polluted by sulphur and sooty matter as any city in Great Britain.

This fact should put us Londoners to shame and stir us into action.

An Advisory Committee.

It is action that I have the honour to propose. I am going to move that steps should be taken to constitute an Advisory Smoke Abatement Committee for Greater London, and I am going to ask the representatives of the various local authorities here to use their best endeavours to that end.

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An advisory committee will have no statutory powers, and no statutory duties, and that means it can be run on extremely economical lines : indeed the cost will be infinitesimal. It also means that there will be no compulsion to join the Committee, though I hope that all local authorities *will* join. Can any district in London say that no unnecessary smoke is created *there*, or that it does not suffer from smoke created in any other district ?

What can a regional advisory committee achieve ? There was a discussion on this matter at the Conference of the N.S.A.S. at Leeds in October last, at which members of the provincial committees to which I have referred described their work. It seems to have been the general opinion that they can do a good deal.

First of all the mere existence of such a Committee, if it does not hide its light under a bushel, has an effect on public opinion. It creates a public demand for action.

Secondly, it can do much by persuasion—the traditional English method of reform. It can supply local authorities with expert advice, and with information as to the results of research. By its influence it can promote a more uniform administration of the law, and a standardised method of taking observations. By encouraging local authorities to include smoke abatement in health week propaganda it can stimulate the education of the public.

Thirdly, such a Committee can organise the training of stokers, if employers will co-operate. It is to their interest to co-operate, for such training often reduces fuel consumption.

In London, however, industrial smoke is not the main enemy. Dr. Owens told us that the domestic fire is responsible for more than two-thirds of what Mr. Julian Huxley has called the air sewage of London. And when one remembers that the other one-third includes all the smoke produced by offices as well as by factories, one appreciates what a small share of London smoke is caused by industry, and how great a sinner the ordinary householder is.

I do not wish to minimise the pollution caused by fires in offices. Undoubtedly one of the greatest offenders is H.M. Government. Dr. Owens told us that the highest concentration of suspended impurity in the air of London is found in Victoria Street—and the next highest, at the Westminster City Hall in Charing Cross Road. Now it is a most significant fact that in the half mile between those two places most of the old Government offices are situated. There the open fire reigns supreme. Go down to Whitehall on any winter morning about nine o'clock, when the charwomen are lighting the fires, and you will see what the Government is doing to the atmosphere of Westminster. I read the other day in " The Times " a suggestion that an easy means of preventing an enemy in the air from identifying particular objectives would be to create a smoke screen over the whole of London. It would seem that by creating a specially conspicuous smoke cloud over Whitehall the Government is enabling an enemy to identify that area and is thus pointing the way to its own destruction ! But to be serious, is it not high time that the coal fires of London offices were replaced by smokeless fuel or central heating ? Surely the Government should set an example to the rest of London.

As to the domestic fire, our hope lies, as Dr. Owens said, in promoting the consumption of gas, electricity and fuel which does not produce smoke. In new houses and offices, where an open grate is provided at all, every effort must be made by propaganda and education to encourage the installation of a type suitable for burning coke or smokeless fuel, and to put coke, etc. on sale in small quantities. Local authorities are becoming such large land-lords that to a considerable extent the remedy is in their own hands. As regards privately owned houses, I would like to see legislation introduced enabling local authorities to charge a somewhat lower rate to householders who create no smoke, or to give grants for the conversion of old grates to new. But that is wandering from the function of a Regional Committee.

Mr. Keeling concluded by formally moving the resolution to which reference has already been made. Before calling on Mr. Hornby Steer to second the resolution the Chairman asked Mr. Damon to speak.

Mr. Damon's Address.

Mr. W. A. Damon, Chief Inspector of Alkali, etc., Works, who was representing the Minister of Health, spoke as follows :

In 1842 a meeting was held in Leeds to draw attention to various inventions for the prevention of smoke. That the matter even in those days was a highly controversial subject is shown by this extract from a circular announcing the meeting :

> " Wm. Beckett, Esq., M.P. for Leeds, will take the chair : he will give each inventor an opportunity of explaining his apparatus : afterwards questions may be asked. It is not, however, proposed to allow inventors to question each other as this might lead to personal remarks being made."

Fortunately this meeting is not immediately concerned with inventions for smoke abatement. Even if it were so, I feel sure that the protagonists would recognise in each other public benefactors and would not so far forget themselves as to make innuendos likely to lead to disorder.

The matter of smoke abatement is one with which the Ministry of Health is closely concerned and one, moreover, in which the Minister takes a personal interest.

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Although the Ministry has, for many years been closely associated with the work that has been done from a variety of angles with the object of reducing atmospheric pollution, its statutory functions as regards smoke are limited to matters such as the following :—

(1) Confirmation of byelaws. P.H. Act, 1936, 104 ; P.H. (London) Act, 1936, 151.
(2) Regulating powers regarding investigation and research by local authorities and other bodies. P.H. Act, 1936, 105 ; P.H. (London) Act, 1936, 153.
(3) Extension or curtailment of the list of exempted processes. P.H. Act, 1936, 109.
(4) Setting up and regulation of united districts and joint boards. P.H. Act, 1936, 6-10.
(This refers to executive and not advisory bodies).

Under the Public Health (London) Act, the byelaws are for the London County Council to make and for the sanitary authorities to enforce. There is no exemption of processes in London. In London, the County Council has some special powers and functions which outside county councils do not possess. Section 152 gives specific power to the Minister to acquire information from the local authorities. I do not suggest that authorities in London are more secretive than those outside, but there the provision is !

The Duty of Local Authorities.

The duty of enforcing the law relating to smoke rests entirely with the local authorities. Enforcement does not necessarily imply prosecution : indeed, we all know that the better way is to encourage means of smoke abatement, the adoption of which will reduce liability of offending against the provisions of the Act. In order, therefore, to secure a satisfactory administration of the law, local authorities need the assistance and advice of competent smoke inspectors.

The sources of smoke can be roughly grouped under three headings :

(1) Smoke emitted from domestic chimneys.
(2) Smoke emitted from industrial chimneys.
(3) Smoke emitted otherwise than from chimneys.

Domestic smoke is not as concentrated as that from industrial chimneys but it is more tarry and it constitutes a very large (many people consider it by far the largest) contributor to atmospheric pollution, although the amount of coal used for domestic purposes is estimated at less than one-fourth of the total consumption. It is outside the law but improvement must follow the increasing use of gas, electricity and solid smokeless fuel for domestic heating. The Fuel Research Board is playing its part in carrying out work in connection with the manufacture of semi-coke and on the possibilities of smokeless combustion of raw coal. Every householder can do his or her bit towards reducing atmospheric pollution, but I fear that Sir David Milne Watson was right when he remarked recently that smoke abatement was a cause with no opponents in theory but comparatively few exponents in practice. Here surely is a case for organised and widespread propaganda which can best be effected by a joint committee.

Smoke from industrial chimneys includes that from steam raising and from furnaces for other process work. The former is merely a matter of the intelligent operation of properly constructed plant of adequate capacity for the work it is required to perform. May I plead that steam raising should be more generally regarded as a skilled job to be entrusted to skilled men ? It is not merely a matter of shovelling coal and raking out ashes. Stokers should be encouraged to attend classes in the technique of fuel combustion and those who succeed in gaining certificates of proficiency should be rewarded by increased pay. The organisation of classes at suitable centres would doubtless be one of the functions of a regional committee.

In mentioning smoke emitted otherwise than from chimneys, I had in mind principally the problem of burning colliery spoil-banks to which the Ministry has in the past few years devoted much attention. Fortunately this particular form of nuisance is not prevalent in the London area.

As regard industrial smoke generally, local authorities possess the power to seek penalties for an emission which is a nuisance. Where black smoke is concerned and especially if there is a byelaw, the procedure is relatively simple. In the case of smoke other than black, the law allows a best practicable means of defence and the fear of being unable successfully to rebut such a defence seems to deter many authorities from taking action. This clearly implies the desirability of employing expert smoke inspectors, whose usefulness in Court proceedings is unquestionable, although their greater scope would lie in their ability to discuss technicalities and to co-operate with industry, the claims and real difficulties of which should receive sympathetic consideration. From my own experience, I am convinced that with very few exceptions, industrialists are as anxious as anyone else to mitigate the smoke evil and that far better results can be obtained from constructive co-operation than by means of threats and imposition of fines.

The possibility of employing a well-trained staff of smoke inspectors is, to my mind, one of the chief arguments in favour of a combination of local authorities.

Personally, I favour " statutory " committees to which the constituent authorities have voluntarily delegated their powers in the matter of smoke, but I understand that legal difficulties make it hardly possible to set up a joint committee of authorities both inside and outside London possessing full statutory powers. It is up to London of all places, as a matter of local and international pride, to sweep away its reputation for griminess, and a joint advisory committee charged with such functions as the constituent authorities care to delegate to it, could operate very usefully in correlating

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the work of its constituents in circulating information, in ensuring uniform administration, in maintaining an advisory service of experts, in propaganda work and in securing greater facilities for the training of boiler and furnace attendants.

In 1936, the Regional Committees sent representatives to confer together with the Alkali Inspectors at the Ministry of Health. A most instructive discussion on the " burning questions " of the day eventuated during which much useful information was exchanged. It is sincerely hoped that further similar conferences will be held and that London will be represented in the future. It is obviously more practicable for the Ministry to deal with a Committee representing a consolidated region than with a number of individual authorities, which may hold conflicting views.

Mr. Keeling has set forth the objects at which he thinks a joint committee should aim and I am glad that he has done so very clearly because I feel that it is vitally important for a committee to apply itself to a definite objective, keeping it continually in view so as to avoid the danger of losing itself in a train of side issues. Another factor vital to the success of a committee is that it should enjoy the confidence and practical support of its constituents. Smoke, unfortunately, has no respect for boundaries, and it is therefore essential that the constituent authorities should recognise their mutual responsibilities. It is no use for an authority to appoint a representative and then take no interest in the reports that he brings back. Enthusiasm at the birth of a Committee is good but it is not enough. A true conception of all the difficulties and a dogged determination to surmount them is necessary. If I may use a homely metaphor which seems apt to the business in hand, you want to make a good fire built up on sound knowledge and experience, but you must avoid the use of excessive hot air lest local overheating should lead to a loss of efficiency. If this Conference will supply the fuel, the National Smoke Abatement Society can be trusted to assist with the skilled stoking and the Ministry of Health will help, too.

A new committee may conclude that certain omissions and nuisances were made in connection with the former committee. If so, benefitting from those previous experiences, it can learn much from other established committees and rise like a phoenix from the ashes of its predecessor.

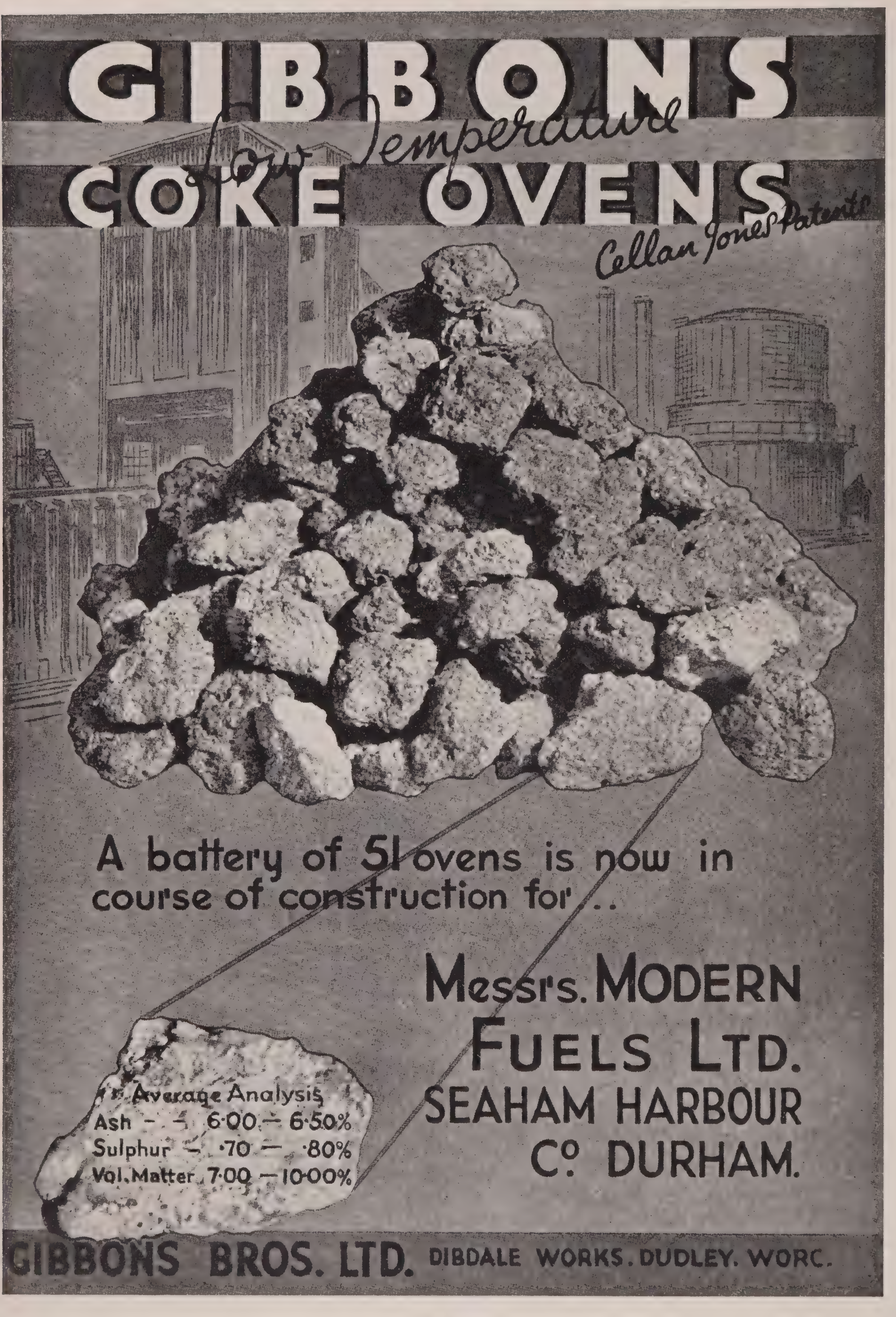
In conclusion, it appears that the problem of smoke can be successfuly combated only by the resolute and persistent activity of local authorities preferably in combination and with the assistance of trained staff, by co-operation with and with the goodwill of industry and by extensive propaganda.

I have to furnish a report of to-day's proceedings to the Minister of Health, who will be greatly interested to know the result of your deliberations and I am instructed to say that any assistance which the officers of the Ministry can properly afford you is entirely at your disposal.

Mr. Hornby Steer's Address.

Mr. W. R. Hornby Steer, M.A., LL.B., F.R.San.I., a member of the London County Council and Standing Counsel to the Society, in seconding the resolution said :

I rise to second the resolution on the paper which has been proposed by Mr. Keeling. It is to this matter that I shall direct my few observations. The evil of smoke pollution is admitted. It is recognised that we have the knowledge necessary to relieve in large measure the injurious effects of this nuisance. Much useful work in this direction has been done by local authorities ; but having regard to the admitted facts of the situation further action is necessary. The question before us in the resolution is in effect this : Would the formation of a joint advisory committee as suggested be action which is likely to result in an appreciable reduction of the evil ? In my judgment it undoubtedly would be so, and I heartily commend the resolution to the Conference. The fact is that Londoners are still not sufficiently regional minded. This was not always the case. I recently had cause to refer to a comparatively early Act of Parliament—the Smoke Nuisance Abatement (Metropolis) Act, 1853. The members of the Conference well know this was not only before the creation of the London County Council but also before the formation of the Metropolitan Board of Works. It is, therefore, interesting to note that the area affected by the Act was defined by means of a schedule containing a number of parishes, including all the then built-up areas and also a number of which must at that time have still maintained their rural character. The area was approximately that of the present administrative county ; but it is to be noted that at that time it included the greater London of that day. Since then we have not shown such a regional attitude. This is, in some measure, due to Parliament which has enacted that the inner part of our town is in regard to smoke nuisances subject to one statute while the outer part is in this respect subject to another, and I suggest that this has had the effect of causing us in this respect to overlook the regional character of greater London. There are a number of instances where it has been found necessary for the provision of public services to be based on an area greater than that of the administrative county. I would, in passing, mention those of Transport, Water and Electricity. These are, of course, services controlled by bodies with executive powers. The resolution before you asks only for an advisory committee. Examples of Joint Advisory Committees in this area are the Greater London Standing Conference on Regional Planning, the London Regional Advisory Council for Juvenile Employment and the London and Home Counties Traffic Advisory Committee. In these cases it has been found necessary to form such Committees, and I suggest that at least an equally strong case exists for the formation of a Regional Advisory Committee to deal with the problems of smoke. Previous speakers have indicated the useful ways in which such a committee



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could benefit greater London ; and there is no need for me to emphasize this aspect of the matter.

It must not be overlooked that in appointing members to such a committee the appointing authority are not being committed to any action which they cannot control and they are not being committed to any action from which they cannot withdraw.

Such a committee is not an executive committee, but is a deliberative committee. It can do no harm—it may do much good.

The cost involved is in the circumstances comparatively negligible, but the gain to the community may be very great. The formation of such a committee may make demands on the time and energy of those who are working for success in this direction, but I suggest to the conference that this effort will be well worth while inasmuch as it is likely to advance to a considerable degree the health and happiness of the people of greater London.

For these reasons I confidently recommend the conference to adopt the resolution before them.

NEWS AND VIEWS

Smoke Nuisance from Tileries.

A case of importance to the Potteries, brought by the Stoke-on-Trent Corporation, was heard in January last, when three tile-making firms were summonsed for having caused factory chimneys to give forth black smoke in such quantities as to be a nuisance.

For the plaintiffs it was admitted, in the case first dealt with, that the company produced red and blue tiles and bricks, and that a certain amount of black smoke was absolutely necessary when blue goods were being fired, but it was contended that the amount need not be excessive. Other firms in the city were producing a similar class of goods without the excessive smoke complained of here. Observations taken numbered 276, and in 39 cases there was no black smoke ; in 129 cases there was black smoke for 15 minutes and under ; in 74 cases for 16 to 25 minutes ; in 29 cases for 26 to 35 minutes ; in four cases 36 to 50 minutes ; and in one case 51 to 60 minutes. The Corporation asked for an order of abatement within a period of three months.

A witness stated that the defendants had not got controlled ovens, but the present ones could be made controlled comparatively cheaply, and such alterations would to a certain extent eliminate the nuisance. Better control and more careful firing were required, and in his opinion there should be no need for more than a quarter of an hour's smoke every two-and-a-half hours.

For the defence it was said that the type of oven in use at the defendant firm's works was in use throughout the country and on the continent, and no other type was used for the production of blue tiles. Defendants contended that it was impossible to prevent the emission of black smoke, but it could be reduced in the making of red tiles. The firm was unable to deny that it was true that dense black smoke was emitted, and said the only way to prevent it was to close down the works.

Indicating that in his opinion there had been emissions of black smoke to such an extent as to be a nuisance, the Stipendiary adjourned the case for one month, and suggested that during that time the defendant firm should effect what improvements were possible, consistent with commercial practicability. In the two remaining cases it was stated that the technical evidence was similar to that in the first case, and these summonses were also adjourned under the same conditions as the first case.

A New School Text-Book.

" Life and Commerce in Britain " is a new school text-book by W. D. Wright (Dent, 2/6) which is described as an approach to social geography. It describes with ample illustrations, the basic needs and organization of the community—such as water, food, clothing, heat, power, transport, news—and their general social implications. The smoke problem is referred to in several places and an excellent aerial photograph (by Capt. Buckham) showing domestic smoke is given a whole-page reproduction. Although in a text-book of such a wide scope any particular question cannot be given any detailed attention it is gratifying to find the smoke problem receiving its due place as a social and economic problem. The book is interestingly written and should be fascinating reading for the eager minds in the upper classes of the senior schools and junior evening schools for whom it is intended.

Glasgow's Clean Face for Visitors.

Excerpts from an Empire Exhibition broadsheet :—

" The Corporation of Glasgow is spending a million and a quarter on beauty treatment for the city so that it will look its best to the millions of Empire Exhibition visitors who will arrive between May and October.

" Public buildings and statues will be cleaned, roads will be widened, new gardens will be laid out . . . . citizens will co-operate with the Corporation, and hundreds of house-owners are arranging to have their homes freshly painted and the stonework cleaned.

" Glasgow Cathedral is being prepared for the many thousands of people who are expected to visit it. The cleaning of the whole building has been undertaken by H.M. Office of Works, and this will be completed before the Exhibition opens. The cleaning will bring out the full beauty of the stonework, decorations on some of which have been obscured for many years. A guide book has been prepared for visitors."

And for Glaswegians too, perhaps !

Railway Smoke in Liverpool.

It was reported to the Liverpool City Council by the Health Committee that the London Midland and Scottish Railway Company have agreed to try the effects of changes in the firing of locomotives in the hope that a method of working will be found which will reduce the nuisance.

The North-Western Branch.

The North-Western Branch of the Society, formerly the Manchester, Salford and District Branch, held a joint meeting with the Manchester Society of Architects on 9th March, at which a paper entitled "Planning Smoke Abatement" was read by Arnold Marsh. The speaker reviewed the principal effects and causes of smoke and discussed the solutions to the problem. Concluding, he said "There are so many plans required for the solution of the smoke problem that it is not easy to correlate them and express them in an easily appreciated form. In brief, however, we must plan on the following lines: (1) A more determined and persistent campaign to develop public consciousness of the smoke evil, and to show the responsibility of the individual as well as the means for abatement. (2) A similar campaign to bring home to Government departments and municipal authorities their opportunities and duties in promoting smoke abatement by administrative work, by promoting and encouraging developments, and by themselves setting good examples. In housing especially it is the greatest pity that so many opportunities should have been lost for the creation of smokeless estates, or even smokeless towns. (3) To ensure that in every way possible all new premises and domestic houses are equipped for complete smokelessness. (4) To set up, in the first instance, suitable smokeless zones in the central areas of the towns, bearing in mind their possible future extensions."

The part that could be played by architects and builders was of great importance. Their organizations were influential, and were listened to by Whitehall and by Local Authorities, but the first step was, of course, for the architects and builders themselves to be aware of what the problem meant, and how it could be solved.

A meeting of the Branch held on 8th April was addressed by Mr. H. Heap, the Manchester City Analyst, on methods by which atmospheric pollution is measured. The three principal ones in use in Manchester are, he explained, the automatic filter, the sulphur candle for sulphurous pollution, and the testing of rainwater for acidity generally. Mr. Heap told of more expensive apparatus which the department cannot afford unless it gives up something else, as the money it is allowed is too small. It was possible, he said, that the gauges at Booth Hall Hospital and Heaton Park might be given up, and work done in some other aspect of the question.

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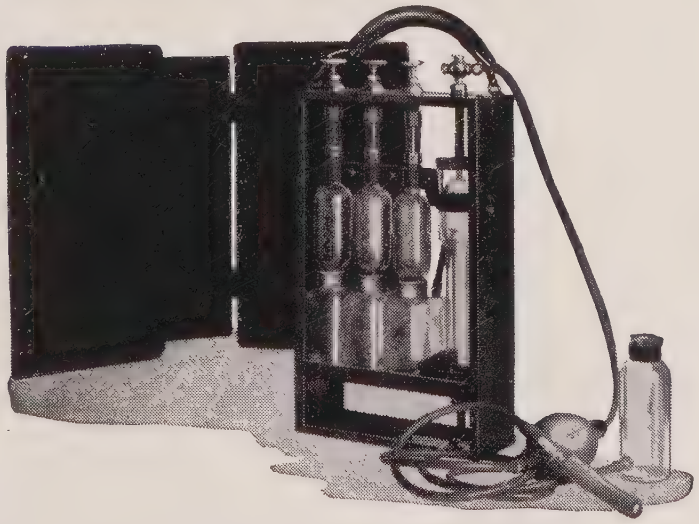

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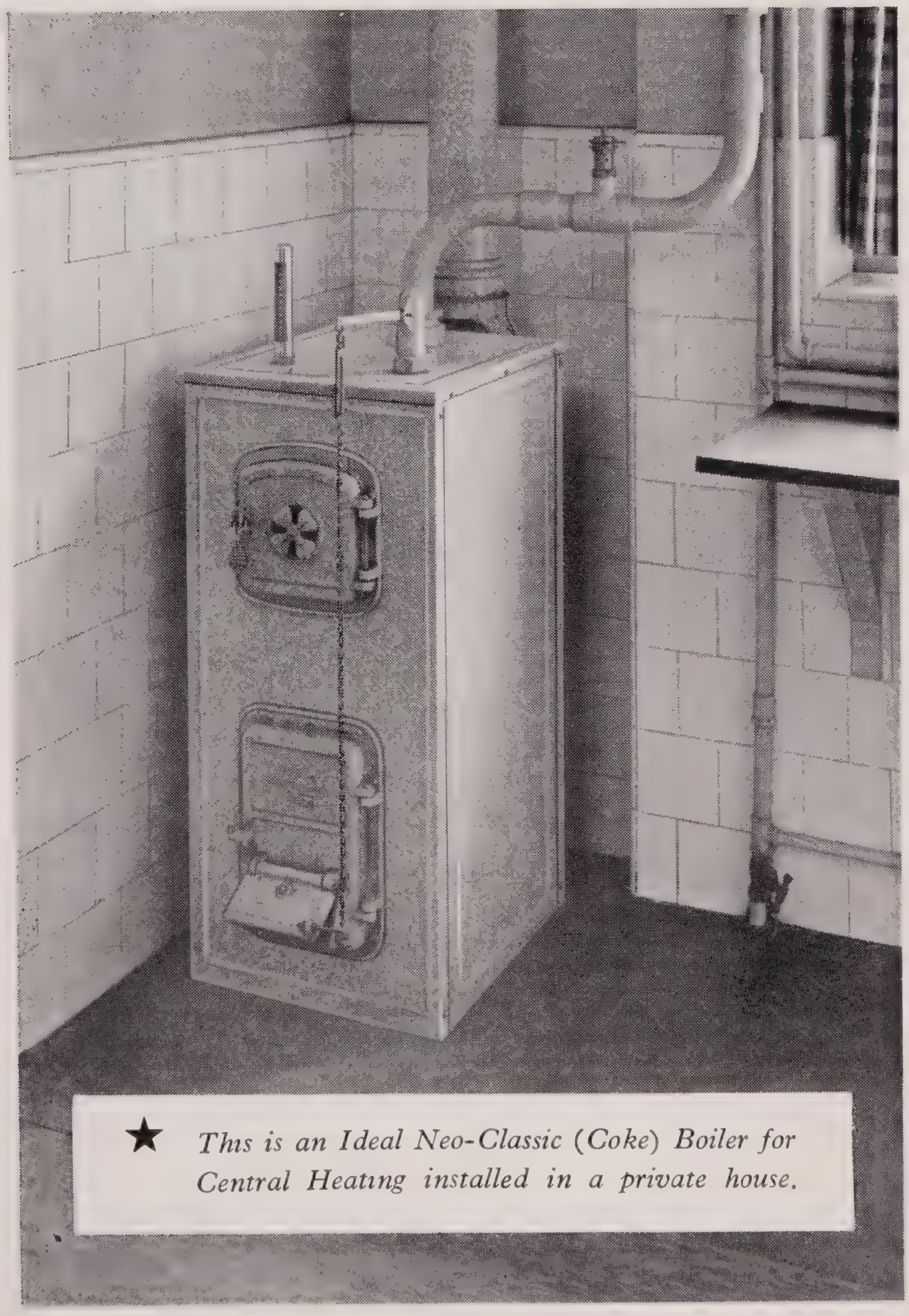

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Published for the National Smoke Abatement Society by The Service Guild Ltd., 49 Deansgate, Manchester 3
and printed by J. Bentley & Sons, Albion Works, Todmorden.

Heat Accumulator, Hamburg (see page 69).

THE JOURNAL OF THE
NATIONAL SMOKE ABATEMENT SOCIETY

VOL IX
NO. 35

AUGUST
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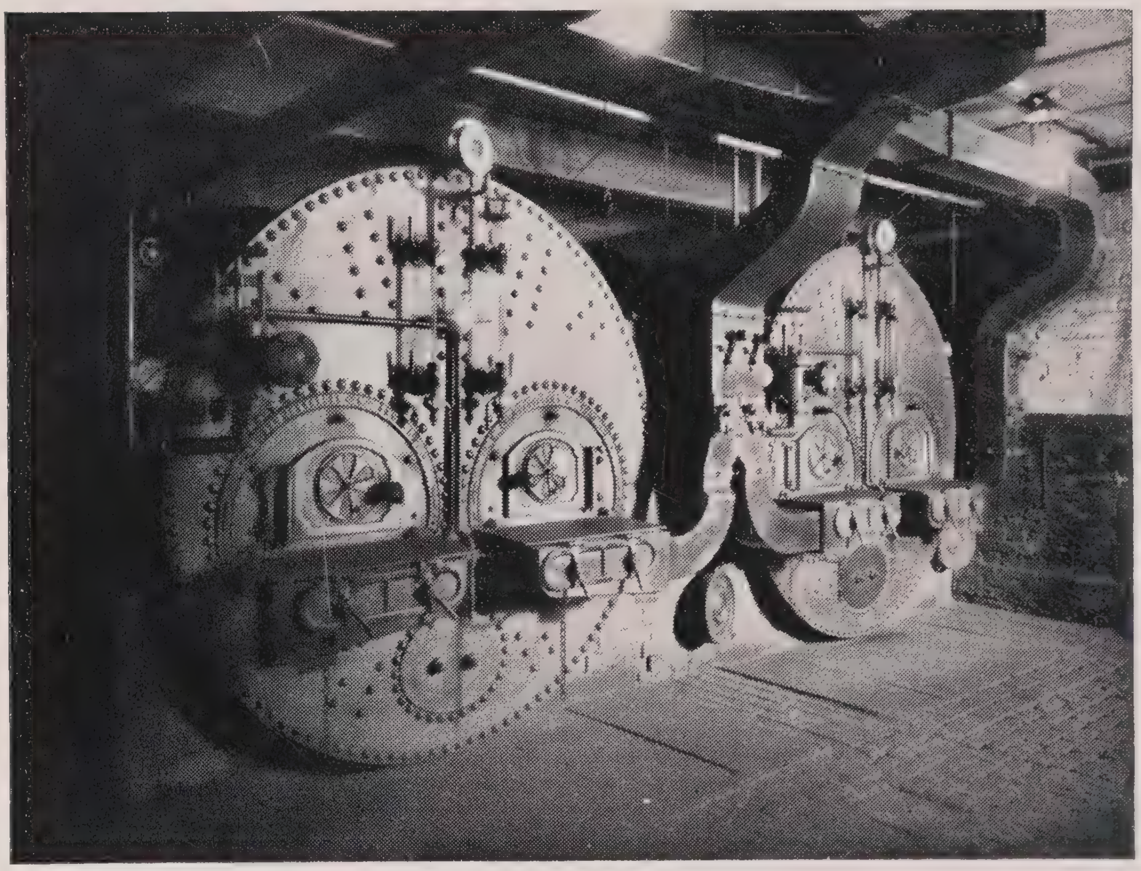

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Vol. 9. No. 35.

August, 1938.

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The Journal is open for free discussion of all aspects of the smoke problem, and the opinions expressed in contributed articles are not necessarily the same as the views of the Society. Quotations and abstraction of matter appearing in the Journal is welcomed, provided the usual acknowledgements are made.

COMMENTARY

TO be able to report in one issue the formation of two new Regional Committees is an unusual event. In May the Greater London Advisory Council for Smoke Abatement was formed, and in July the Bristol and District Advisory Smoke Abatement Committee. This brings a total of seven advisory committees of municipal authorities and one statutory committee. There are now few further areas in which regional collaboration in this way would be desirable. South Wales and north-east Lancashire might find such committees of value and the Potteries area certainly would. It is a pity that recent efforts in this last district, which has a difficult and serious problem, should have been unsuccessful.

There is considerable significance in the story of the Yorkshire manufacturer who has offered a reward of £10 to anyone who discovers his factory chimney emitting black smoke. It is a new kind of proof that excessive smoke can be prevented and it can be used to convince the sceptic who is occasionally encountered. To obtain the fullest emphasis one should not forget to mention, of course, that the manufacturer concerned is a Yorkshireman.

All is set for the Cardiff conference, which promises to be well attended and interesting. The principal subjects for discussion are on "How South Wales is assisting Smoke Abatement," and "The Duties and Opportunities of Local Authorities in Smoke Abatement." There will also be one or two resolutions that might arouse some discussion. Those who do not know the Welsh capital will have the experience of seeing how beautiful and dignified the civic centre of even a large and busy industrial city can look, and will see also how the smokeless coals of South Wales have helped to keep the stone of the buildings in an unusually clean and white condition. The conference opens on Thursday, 29th September with a reception at the City Hall by the Lord Mayor, and ends on Saturday, 1st October.

Much publicity was given in the press recently to the statement by the Town Clerk of Manchester to the Royal Commission on the Geographical Distribution of the Industrial Population, that "the atmospheric conditions of Manchester are, from the purely strategic point of view, a probable advantage in the event of national emergency under modern conditions." This followed some forceful remarks on the way Manchester suffers from a polluted atmosphere. It is not felt that much reliance can be placed upon our urban smoke screens in relation to aerial attack either in this way, by hiding the towns, or in the opposite way, by betraying their presence. The pall of smoke does, frequently, make it difficult to see actual landmarks, but as the aerial bombing of open towns appears to be largely indiscriminate it might be argued that bombs dropped into the densest patches (such as Whitehall, as Mr. Keeling has suggested) would be sure to do damage of some kind. During periods of fog or low visibility our smoky towns are deeply shrouded, but aerial attack is not likely to be made under such conditions in any case. It is at such times, however, that normal civil aviation finds its difficulties enormously increased by the alliance of water vapour and smoke particles.

As reported elsewhere the proposal for a smokeless area in Manchester is progressing and has been accepted in principle by the Manchester Health Committee. Its importance seems to be confirmed by the promptness with which the coal interests have voiced their protests. Their arguments, however, are largely beside the point, and those concerning the possible increase in the price of house coal and the adverse effects upon railway revenue might have to be taken seriously if it was being proposed to make the whole of Manchester, or all the north of England, smokeless. But the present scheme is only for smokeless conditions in the central area, which has been mapped out so as to exclude residential districts, and where the only open fires are those found in shops, offices, hotels, and administrative buildings. It is also argued that the way to smoke abatement is through developing means for burning coal smokelessly, rather than by the use of smokeless fuels. As far as industrial smoke is concerned, yes — the smoke abatement movement has been saying that for at least forty years—but, while recognising the possible value of the research initiated by the C.U.C. for a smokeless open coal fire, the fact remains that at present such fires do not exist. If in the future they should be available there would be nothing to stop them being used under the proposed conditions of the smokeless area, for it is suggested that smoke emission only should be the offence and that the authorities would not be concerned with the fuel or the type of appliance used.

"The Law of Smoke Nuisances," by W. R. Hornby Steer, M.A., LL.B., the Society's Standing Counsel, is enjoying a good sale which looks like continuing steadily. It should have been mentioned in the review that appeared in the last issue that the book is obtainable direct from the Society and that there are two editions, cloth-bound at 2/6, and paper-backed at 1/-, both post free.

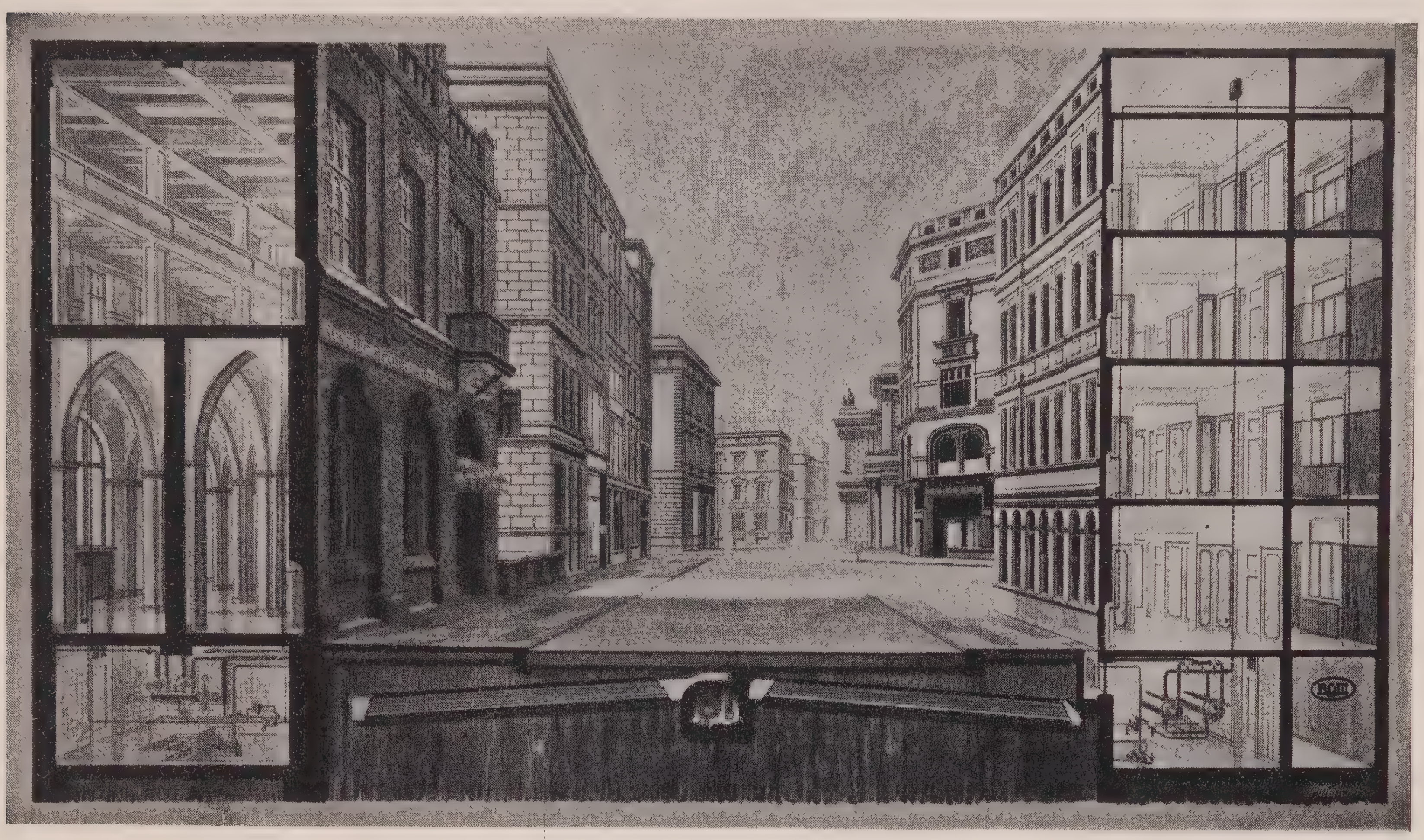


Fig. 1. Street section with Steam Main and Connections.

DISTRICT HEATING

By A. MARGOLIS, Dipl.Ing.

District Heating is the last step in the development of central heating.

Central heating has already been developed in the nineteenth century, first as steam, later as hot water heating and in recent years, especially for factories, as superheated hot water heating. When air heating is used as a plenum system, or with unit heaters, the air can also be heated by steam, hot water or superheated hot water.

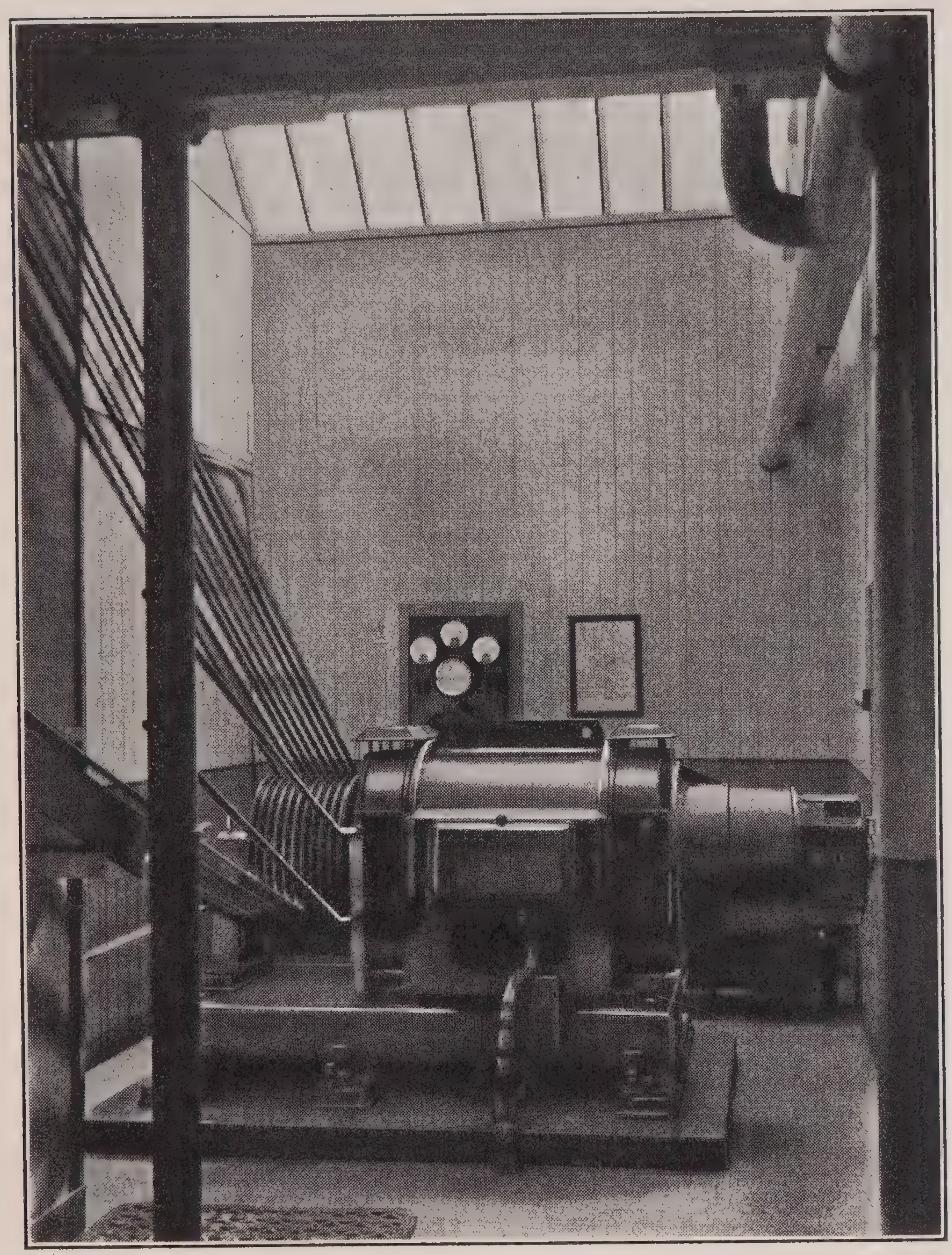
Greater economy of fuel, the avoidance of the multiplicity of fire places and, in consequence, the elimination of coal and ash handling in the rooms resulting in greater cleanliness, the more permanent and comfortable heating at a controlled even temperature, and the much reduced danger of conflagration are the acknowledged advantages of central heating. In each building, however, there yet remains the necessity for a boiler plant requiring attendance, transport of coal and ashes with all their inherent inconveniences and drawbacks.

The aim of district heating is to do away with all these disadvantages and to supply heat to the buildings for space heating or process work from a central generation plant through an underground distribution system, in the same way as water, gas or electricity.

From the standpoint of the National Smoke Abatement Society it would be an ideal solution. In a town with general public heat supply like other centralized services, the burning of coal would be confined to only a few generating stations which can be situated outside the town and the flue gases of which can be cleaned of any smoke and dust by electrostatic precipitation. All smoke and all the nuisance created by it would be eliminated and the air, at least in the districts without heavy traffic, would be as clean as in the country.

With regard to the fog nuisance, the conditions in the town would be even much better than in rural districts. At present the fog, which is carried by the wind from the country into the town, is, by mixing with the smoke-laden air, intensified, and can hang over the town for hours or even days after the wind has dropped or come to a standstill. In the future, when district heating will be generally adopted, the country fog carried into the town would be dissolved by mixing with the clean and warmer air of the town. The town with all its buildings can be considered as an enormous apparatus for heating the outside air, because all heat supplied to the buildings is finally transmitted to the air. The warmer air, being lighter, has the natural tendency to rise, and when it is clean it must have the same dissolving effect on fog as heated air on vapourousness in a dye works.

SMOKELESS POWER



This 110 H.P. Motor provides power for one floor of a mill, the whole of which was previously driven by steam engine and its boiler house.

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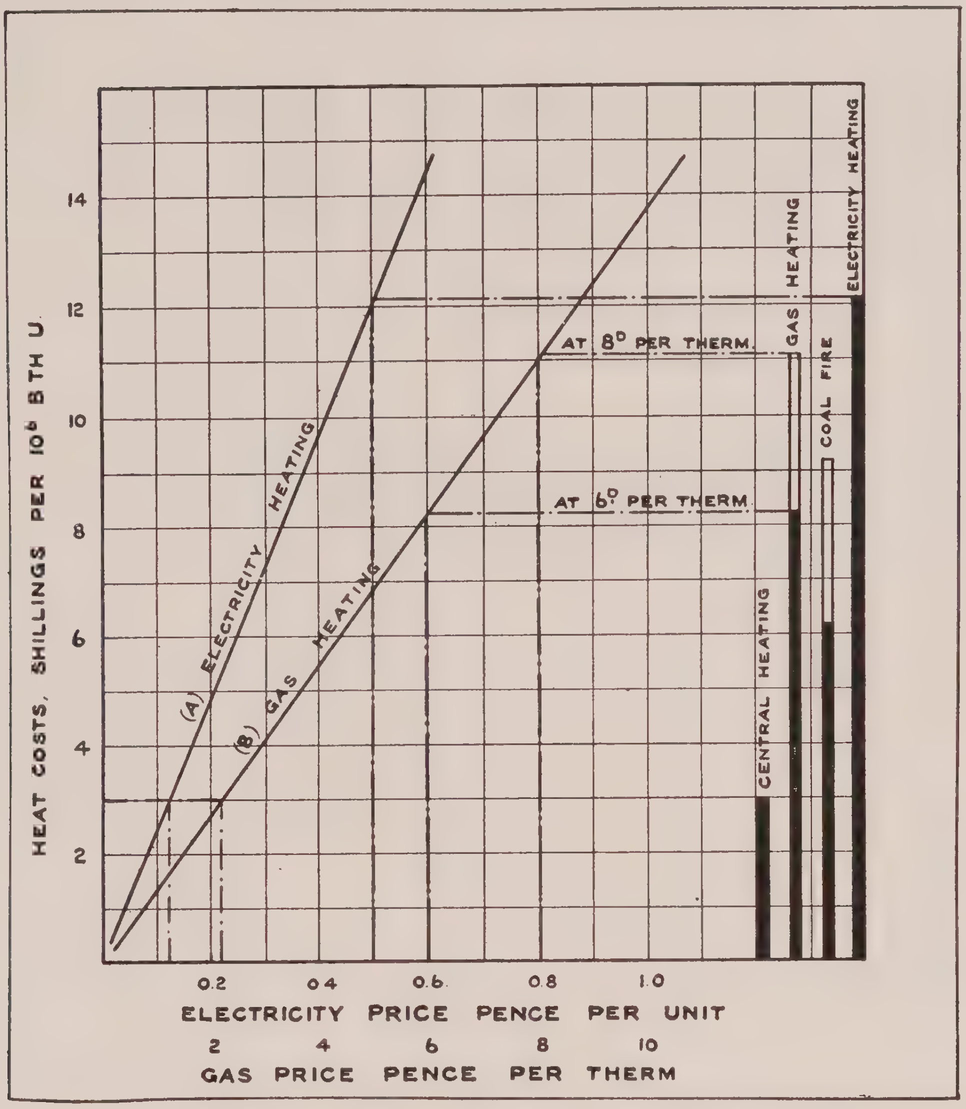

Fig. 2. Comparative Costs of Various Heating Methods.

It must be further considered that the smoke-polluted air of the big centres of population is dispersed over the country and results in an enormous increase in the number of nucleus for formation of fog. It can therefore be assumed that with the general adoption of district heating, the frequency and intensity of fogs will be diminished also in the rural districts.

In face of these paramount advantages, it appears rather remarkable that district heating is still unknown in this country and that its extent, when applied in other countries is limited to the best quarter of a town.

The Distribution System.

The main difficulty in introducing district heating is the erection of the distribution system. The pipes cannot be put in the ground in the same manner as cold water or gas pipes because they expand or contract according to the temperature of the heat carrier. The pipes have therefore to be installed with expansion joints and on rolls or supports allowing this movement. Further, the piping has to be covered with insulating material for heat loss protection. A special peculiarity of heat distribution is that a double pipe system is required, a flow pipe for the heat transmission and a return pipe for the cooled heat carrier. In consequence, the pipes of a heat distribution system, or at least the mains, have to be arranged in conduits and thus they require more space and are more expensive than pipes for cold water or gas supply.

Fig. 1 shows a cross section of a street with a steam and condensate main and connections to two buildings. On the left, the picture shows the steam supply through a reducing valve to a header from which the steam is distributed to radiators ; on the right, the connection to a building with a hot water plant. The hot water is heated to the desired temperature in calorifiers and the condensate is carried to the main condensate pipe and returned to the power station to be used as feed-water for the boilers.

In the picture all other mains for cold water, gas supply, drainage, cables for electric light and power supply, telegraph and telephone service have been omitted for clearness, but in many streets it is not easy to find the space which is required for new mains. Sometimes other pipes have to be removed into a new position to enable the arrangement of the heating conduit, and this naturally makes the erection even more expensive.

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Another difficulty is the comparatively small load of heating plants. The whole district heating plant with the boilers, mains and connections must be able to meet the maximum requirements of a very cold day and allowance is to be made for future connections. The number of exceptionally cold days, is, however, limited and the result is that on an average the plant is utilized only to a small extent of its capacity and this means comparatively high capital charges.

A further peculiar difficulty in introducing district heating in this country is the great popularity of open fires. It is said that the Englishman "oppressed as he is during the day time by the humid airs and dreary sunless skies of his winter environment, seeks relief at home at night by his radiant fireside." *

Of course it is very cosy to sit and chatter round an open wood or coal fire but it is, unfortunately, a most unsatisfactory and expensive method of heating. It is very interesting to note that central heating is nowadays also generally adopted in this country for factories and office buildings as the most economical and labour saving heating system, but the vast majority of housewives have still to bother with fireplaces, and coal and ash handling. It is a waste of money, time and labour, and in big towns a menace from the public point of view. In consequence of the poor efficiency of open coal fires, only 20 to 30 per cent of the money, time and labour, is effectively utilized and 70 or 80 per cent. is lost and in addition the air we breathe is polluted with considerable quantities of smoke and soot.

Owing to their inefficiency and draw-backs the open coal fires will sooner or later disappear as a heating system. In the future they will be used only in exceptional cases as a reminder of the romance of the past, like wax candles or horse carriages to-day. This is already the case in many buildings which are heated by central heating and which have a few fire-places for decoration and occasional use.

We have outlined the difficulties in introducing district heating but these difficulties can be overcome, and considering the advantages of this system there can be no doubt that they will be overcome.

Comparative Costs.

The effectiveness of central heating is superior to any other heating method. It provides an hygienic permanent heating and at a price lower than that of any other system.

In the diagram Fig. 2 the costs per one million B.Th.U. of the main heating systems are shown in comparison with central heating. The costs for electric heating at different prices per unit and at 100 per cent. efficiency are indicated by line A. At a halfpenny per unit the price per one million B.Th.U. is 12.2 shillings as compared with 3s. per one million B.Th.U. for a central-heating plant. For this plant, coke with a calorific value of 11,000 B.Th.U. per lb., a price of 40s. per ton and an average annual efficiency of 54 per cent has been assumed. Electric heating at a halfpenny per unit is consequently four times as expensive as central heating.

The costs for gas heating are indicated by line B. At a price of eightpence per therm and an average annual efficiency of a gas fire of 60 per cent., the price for one million B.Th.U. is 11.1 shillings or 3.7 times as high as central heating, and at a price of sixpence per therm 8.3 shillings per one million B.Th.U., still 2.77 times as high as central heating.

For electric and also for gas heating the advantage is claimed of better control in accordance with the requirements. No doubt, additional savings can be achieved by shutting down the heat supply when there is no demand. But the same method can be applied to central heating by closing or opening the radiator valves. Of course, it is seldom applied because the cheap heat allows more permanent and more comfortable heating at an even temperature and a waste of heat is avoided by general control. It must be considered that, for the rise of temperature not only of the air but also of the walls, furniture and so on, a certain time is required, and with electric or gas fires a certain interval is, therefore necessary, before one obtains the comfort of a well heated room.

For gas fires as for coal fires the special advantage is claimed of good ventilation. The air change is unfortunately limited to the floor zone ; makes the room draughty and only a small part of the air change has a real ventilating effect.

From the diagram Fig. 2 it is to be seen that electricity would have to be supplied at a price of 0.12 pence per unit and gas at 2.2 pence per therm for the same supply of heat at a cost equal to that of a central heating plant with coke at 40s. per ton.

It must be remembered that to-day's gas and electric heating tariffs can hardly be reduced any more. They have been introduced in consideration of the fact that the supply works and distribution systems already exist, thus permitting the additional heating supply at rates which are debited only with a small part of capital charges or are not debited at all. If it were possible to introduce gas or electric heating to a very large extent, both plants and the distribution systems would become insufficient, and considerable extensions of existing plants and erection of new big plants would become unavoidable. This would at once necessitate the increase of the rate for gas and electricity due to the corresponding capital charges. Electric and gas heating consequently are and will remain a luxury. They can, therefore, be applied only when the heat demand is comparatively small and convenience is an important factor as in the case of domestic hot-water supply and this applies to some extent to single fires as long as buildings have no central-heating plants.

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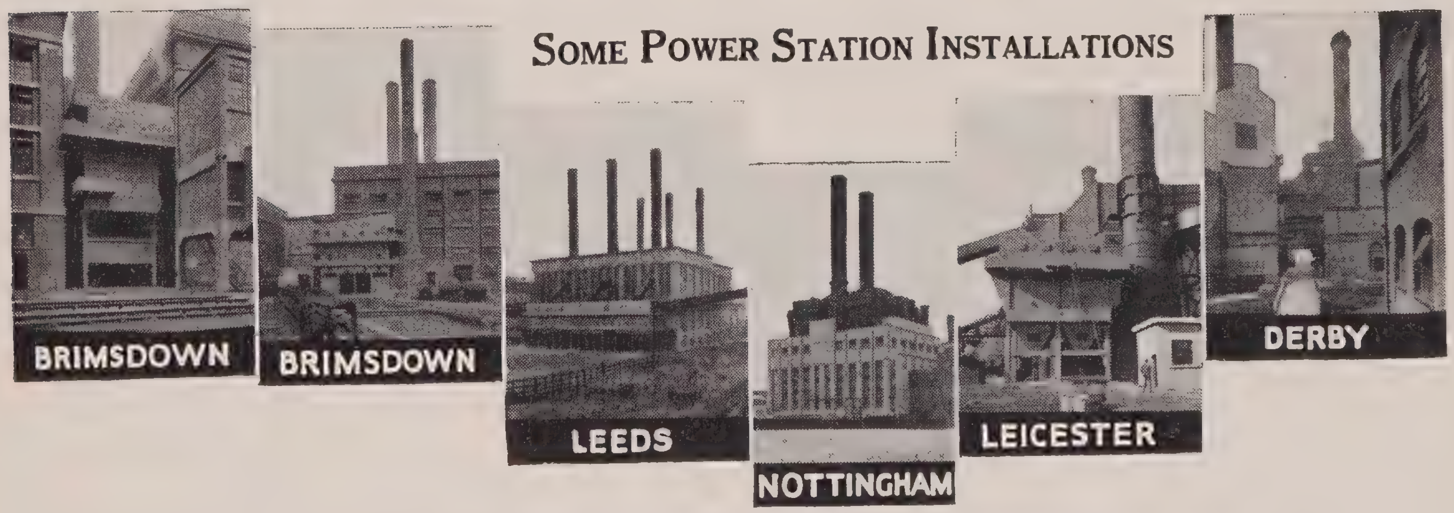
* "Coal—its Constitution and Uses," by William A. Bone and Godfrey W. Himus, p.524.

SOME POWER STATION INSTALLATIONS



North Metropolitan Power Station Co. Ltd., Brimsdown	2
North Metropolitan Power Station Co., Ltd., Brimsdown (repeat)	2
City of Nottingham Electricity Dept., North Wilford Station	4
County Borough of Derby Electricity Supply, Full Street	1
County Borough of Derby Electricity Supply, Full Street (repeat)	1
County Borough of Derby Electricity Supply, Full Street (repeat)	1
County Borough of Derby Electricity Supply, Full Street (repeat)	1
County Borough of Derby Electricity Supply, Full Street (repeat)	2
City of Leeds Electricity Dept., Kirkstall	3
City of Leicester Electricity Dept., Freeman's Meadow	1
City of Leicester Electricity Dept., Freeman's Meadow (repeat)	2
County Borough of Brighton, Southwick	2
Kent Electric Power Co., Littlebrook	3
Edmundson's Electricity Corporation Ltd., Upperboat	2
Edmundson's Electricity Corporation Ltd., Upperboat (repeat)	2
Durban Electric Supply, Congella	2
North Seeland Power Station, Denmark	2

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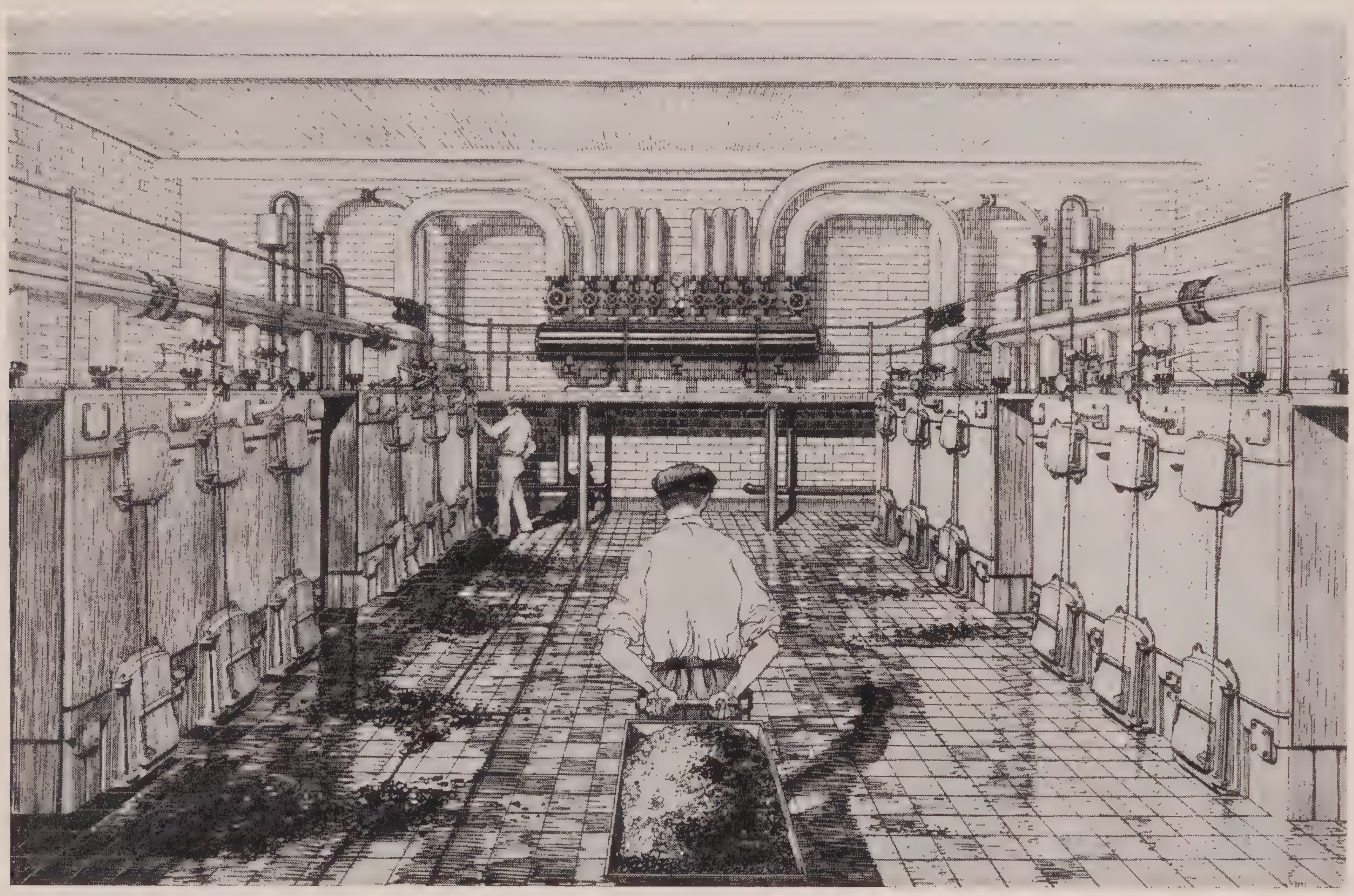

Fig. 3. Steam Heating with Boiler Plant

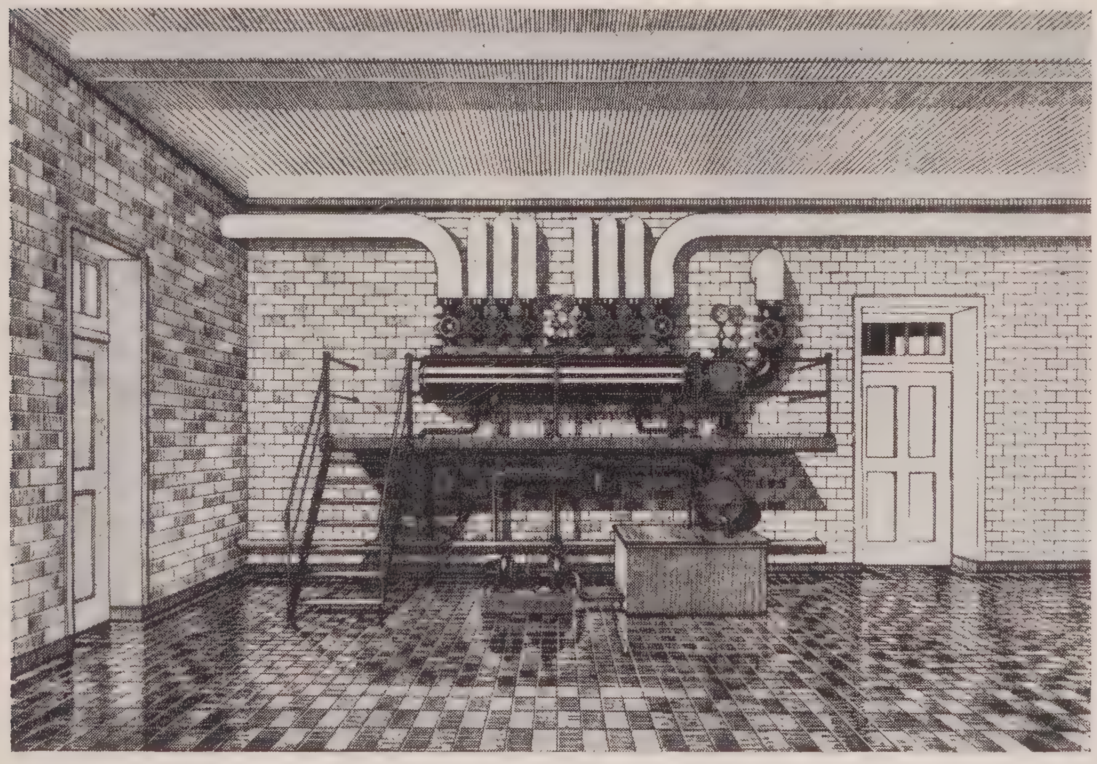

Fig. 4. Steam Heating with District Heating Supply.

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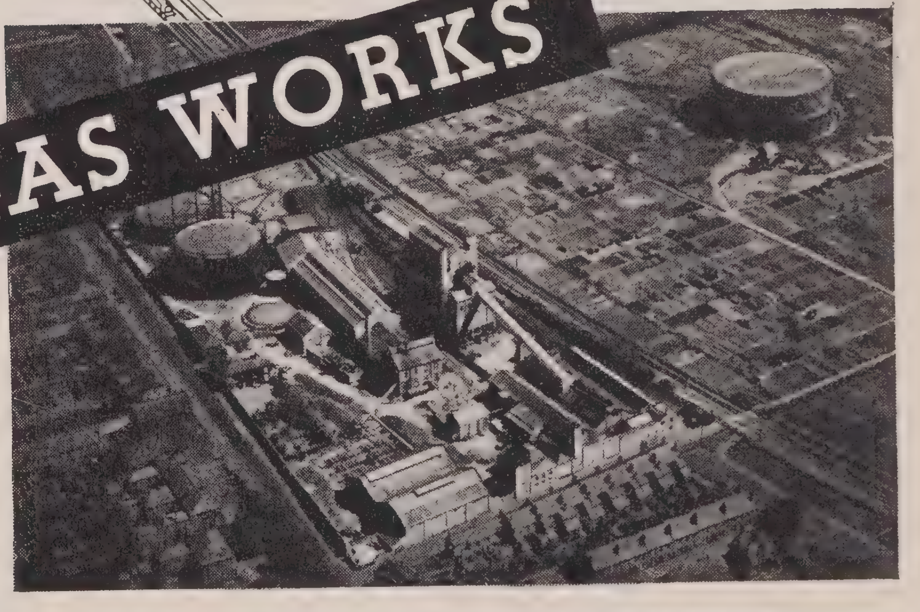

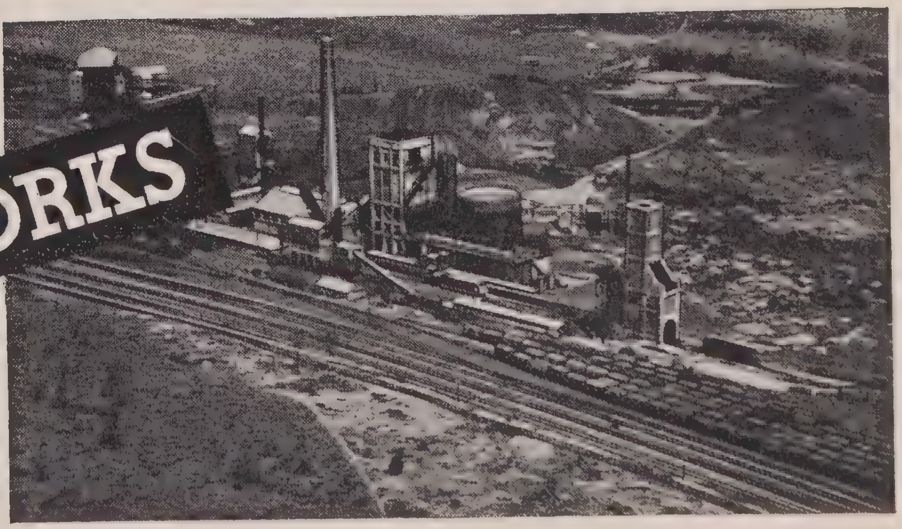

W-D

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T.G.S.

The most astonishing fact is the expensiveness of coal fires. At a coal price of 50s. per ton with a heat value of 12,000 B.Th.U. per lb. and an average efficiency of 20 per cent., the price is 9.3 shillings per one million B.Th.U. and an efficiency of 30 per cent., 6.2 shillings per one million B.Th.U. It is from two to three times as high as the heat of a central-heating plant.

The only disadvantage of central heating is, as was mentioned at the beginning, that a boiler plant is required in every building. But so great is the superiority of central heating in comparison with other heating methods that, despite this disadvantage it is being introduced on an ever increasing scale. Nearly all new buildings in U.S.A., Germany, Holland and Scandinavia and to a great extent also in this country, are being equipped with central heating. This development is and will be naturally facilitated by district heating service. With heat supply from a district heating plant, it will also be much easier to install central heating in old buildings.

Advantages.

The great improvement of central heating by heat supply from a street main can be best realized by comparison of Figs. 3 and 4 which show the heat supply by steam of a big department store before and after connection. With the connection to the district heating system, the valuable space for the boiler plant and fuel storage became available for other purposes.

When the heat is supplied by means of hot water, the arrangement of the connections is even more simplified. Hot water distribution is especially convenient for residential districts.

The heat supplied to the buildings is metered and paid for accordingly. The customers have the advantage of being rid of all the inconveniences of coal supply, firing and ash removal, and have an ever ready heat supply which can be easily regulated according to weather conditions.

The heat for a district heating plant can be generated in big boilers with cheaper coal and a much better efficiency than in the small boiler units of the central heating plants. The savings, however, are only in exceptional cases sufficient to allow public heat supply on a commercial basis, because the load factor of a district heating plant is, as already mentioned, comparatively low and the capital charges are therefore high.

These charges can be reduced in a considerable degree by combining district heating with electric power generation. Not only can the same boilers be used for heating and power generation, but, what is even more important, the electric power can be generated by back pressure turbines. The heat energy of the high pressure steam is utilized as far as possible for power generation and the exhaust steam is carried by the distribution system of the district heating plant to the buildings for all kinds of heating purposes. The heat can also be distributed by means of hot water.

This method gives the highest efficiency in utilization of coal. The modern steam power stations work with an average afficiency of about 25% and as they are being developed now, with superpressure steam, the efficiency can be increased to slightly over 30%. With a combined power and district heating plant, however, an overall efficiency of 75% and even more can be obtained. The exhaust heat is therefore the cheapest heat available for district heating plants.

The requirements for electricity and for heat differ to a very great extent during the day. The highest peak of heating is in the morning and the demand drops in the afternoon and often also in the evening, whereas the electric load has its usual peak in the early evening. Fortunately, heat can easily be stored in the form of hot water, and, by arrangement of big capacity accumulators, the generation of electricity in a combined power and district heating plant becomes independent of the fluctuation of the heat requirements. The heat which cannot be used in the afternoon and evening is simply stored for the peak load of the next morning.

On the cover is shown the accumulator of the district heating plant in Hamburg. It has a water capacity of 580,000 gallons and a heat storage capacity of 400,000,000 B.Th.U. equivalent to the heat value of 116,000 electric units.

By the general adoption of district heating, many millions of tons of coal will be saved, thus further decreasing the amount of discharged flue gases.

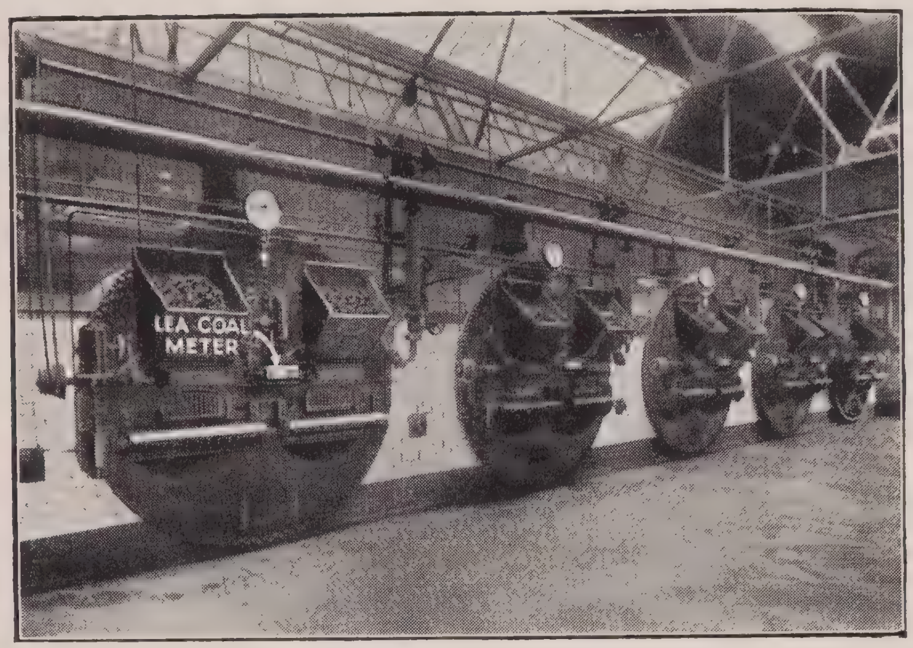
The big savings of coal will naturally have also a beneficial effect on the further development of electric supply. Generation of power and heat with the same coal will enable the use of electricity for heating purposes on a very large scale.

There are many difficulties still to overcome before it is possible to realize the outlined development but nowadays there is hardly a technical problem which could not be solved ; the main point, however, is to prove that there is either an economic advantage or a public necessity which makes it worth doing. When the necessity of district heating and smoke prevention is fully realized, the outlined development will be recognized and the general adoption of district heating will follow.

Exhibition at Lille.

An important exhibition on Social Progress will be held at Lille, in 1939, and will contain a section on smoke abatement. This will be divided into sections showing the effects of smoke, its measurement and detection, methods of abatement, smokeless methods of heating, modern types of furnace, grit and fumes prevention, transport fumes, and on the law and public and private action. Information concerning this section may be obtained from M. R. Humery, 28 Rue de Liege, Paris, 18.

“MORAL EFFECT”



Battery of Lancashire Boilers at a Public Institution in Lancashire. All the Hodgkinson Stokers are fitted with Lea Coal Meters.

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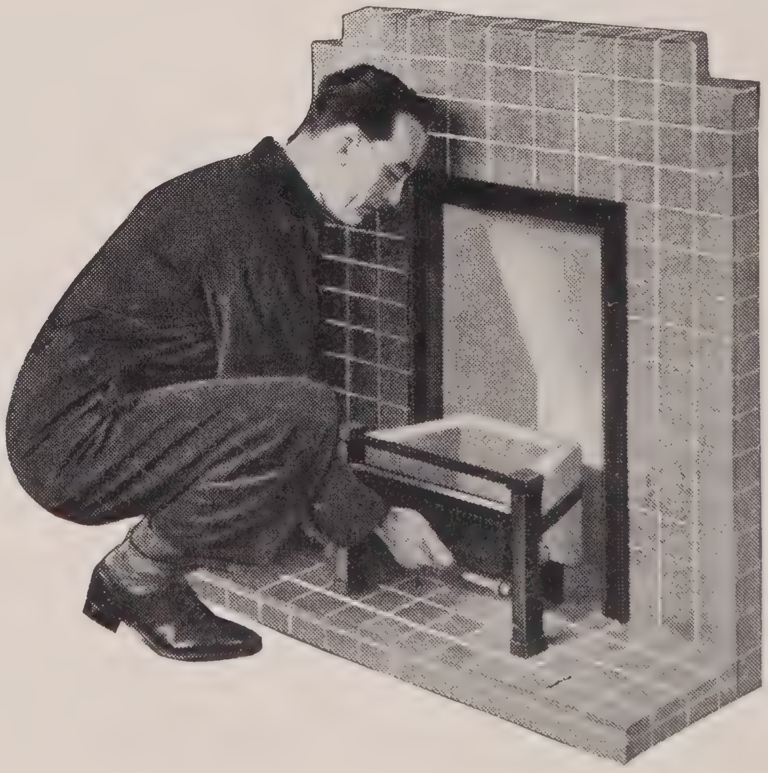

The room that has a Metro Coke Fire installed is a cosy room, a clean room, and the cost of fuel is reduced to 4d. or 5d. per day. Decorations and furnishings retain their freshness. Laborious fire laying and chimney sweeping are abolished. Insist upon the genuine Metro Grate—the original and successful fire. In many attractive designs suitable for modern or period decorations. See them at the Welbeck St. Fireplace Galleries, 38 Welbeck St., London, W.1.

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OIL FROM COAL

In its broad and most of its particular aspects the question of the production of oil from coal, which is the subject of two new reports of importance, does not directly concern smoke abatement and is therefore outside the scope of these columns. In one respect however, that of the production of oil by means of the low temperature carbonization of coal, smoke abatement is a factor of importance, for the principal product of low temperature processes is an open-grate fuel which will if it continues to be developed, be one of the principal substitutes for raw coal in the domestic fire.

From our point of view, therefore, it is to be regretted that the Report of the Sub-Committee on Oil from Coal (the " Falmouth Report ") published by H.M. Stationery Office (1/3 net.) should not have found it possible to recommend an encouragement of low temperature carbonization for the purposes of oil production. Rightly regarding the solid smokeless fuel as the primary product, the Committee appear to consider that the future of the industry should depend wholly upon the normal but unencouraged domestic demand, and do not accept the view that legislation or other forms of encouragement in the use of smokeless fuels would be accompanied by a correspondingly large and permanent production of low temperature coke and of oil.

The smoke problem is referred to in a somewhat lukewarm fashion when stating that " low temperature coke provides a good fuel with valuable smokeless and radiating properties particularly suitable for domestic purposes, and on this account many people advocate a wide extension of the use of fuel of this class, in order to improve the atmospheric conditions of the large towns."

The Committee was of the opinion that there was no assurance at present of a really large market for this class of fuel, and even though legislation was passed to compel the use of smokeless fuels such a measure might also stimulate the consumption of alternative fuels—high temperature coke, smokeless coals, and grates for the smokeless combustion of bituminous coals.

It is to be expected and hoped that these other fuels will be stimulated, but there is no reason why the low temperature fuels should not obtain a fair and considerable share of the enormous potential market. Indeed, such a share is inevitable because these are the only fuels generally available which can be used in the millions of firegrates that are likely to be in use for a long period of time and in which the alterations necessary for the alternative fuels are not likely to be made.

The Committee appear to have been impressed by the views of representatives of the coal industry that the extended use of low temperature coke, made from the cheaper grades of small coal, would reduce the sale of household coal which is the most remunerative side of the coal industry. From the narrow point of view of the present organization and profit-making basis of the coal industry this may be true, but from the national point of view, social as well as economic, and bearing in mind the consequences of the smoke nuisance created by that household coal, it is manifest that such a state of affairs is scientifically indefensible.

The Labour Party Report.

A Committee of its members appointed by the Labour Party has also just issued a report on the same subject (" Oil from Coal," Labour Publications Dept., Transport House, S.W.1., 1/- net). Again there is no intention of reviewing the principal aims and recommendations of the report, but considering it only from our special point of view. In the first place the section of the report dealing with low temperature carbonization constitutes a most valuable and complete survey of the many different low temperature carbonization systems, with much up-to-date data not otherwise easily obtainable within the same covers.

The Committee clearly regarded the smoke problem with more sympathy and seriousness than did the Government Committee and it is stated that they were " impressed by the magnitude of the nuisance." The principal reference is as follows :

" But the low temperature coke, not the gas or motor spirit, is the main product, and the production is controlled by the rate at which this main product can be sold. At present it is sold almost entirely for domestic purposes. As a domestic fuel, low temperature coke has great advantages. The chief is that it is smokeless, or practically smokeless. The waste of valuable raw materials when coal is burnt in the raw state, and the damage done by coal smoke, are now well known, though not sufficiently appreciated by the general public. A formidable indictment has been drawn up against coal smoke on the grounds of pollution of the atmosphere, promotion of fog, injury to health, damage to buildings, soiling of clothes and hindrance to aviation. The damage done by the burning of a ton of raw coal is estimated on the average at no less than 10/-.

" Gas and electricity provide a method of smokeless heating ultimately derived from coal, and each fuel has its advantages for special purposes. But the open fire has physiological and psychological merits which cannot be gainsaid. Low temperature coke satisfies this demand for smokeless open fires."

The Committee's recommendations and conclusions with respect to low temperature carbonization are as follows :—

" As South Wales possesses an abundance of naturally smokeless coals, it is unlikely that there will be any development of low temperature carbonization there beyond what is now being undertaken semi-privately.

TO ALL USERS OF FUEL IN NEED OF EXPERT ADVICE ON:

- *SMOKELESS OPEN FIRES*
- *CENTRAL HEATING*
- *HOT WATER SUPPLY*
- *AIR CONDITIONING*
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The London and Counties Coke Association gives technical assistance to all users of fuel, to those installing heating or drying plant of any description, to Architects and to Heating Engineers. Its Engineers and Fuel Experts attend personally to advise on installations of plant, to carry out boiler tests and to assist in securing the greatest efficiency. The Technical Department of this Association makes a thorough investigation of the special needs of each individual case, freely and without obligation and gives impartial advice on the plant or the methods to be used.

★ Authoritative Brochures dealing with the subjects above ● have been issued by the Association; these give full descriptions and illustrations of the different types of plant which have been tested and approved by the Association. Copies will be sent free on request.

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THE LONDON & COUNTIES COKE ASSOCIATION

1 GROSVENOR PLACE, LONDON, S.W.1 (SLOane 5136)

It is suggested that two plants should be established in Lancashire, where the smokeless fuel might be welcomed by the large populations of Liverpool and Manchester ; one plant in Cumberland, possibly to work in conjunction with a " grid " power station if the claim of the county to have such a station is granted ; one in Scotland ; and one in south-west Durham, which is almost entirely dependent on the coal industry and enjoys a relative immunity from air attack."

" The Committee were impressed by the magnitude of the smoke nuisance and consider that the widespread use of low temperature coke would mitigate that evil while meeting the general desire for an open fire, and would at the same time make available appreciable supplies of oil and motor-spirit. But it is considered that the price at present demanded for low temperature coke is an effective barrier to its widespread use, and until the price can be substantially reduced it is not proposed to recommend a ban on the burning of bituminous coal in the raw state, such as exists in some American cities. The entry of the State into the industry would settle whether the price can be reduced or not."

It is unfortunate that the last quoted paragraph should refer to the ban in some American cities on the burning of raw bituminous coal, for, as has been mentioned previously in these pages, there are in fact no such restrictions in any American city. New York is generally cited as the city in which this ban applies, but as reported recently, no less than three-eighths of the fuel burned in that city is bituminous coal.

THE REPORT ON ALKALI, Etc., WORKS

POWER STATION RECORDS

Eight pages of the new annual report on Alkali, etc., Works (H.M. Stationery Office, 1/-) are devoted to smoke abatement questions and indicate the close attention that these are now being given by the Alkali Inspectors. It is stated that Inspectors have kept in touch with the Regional Committees and mention is made of the newly-formed Greater London Council and the moves for a regional organization in the Bristol District. " The Potteries," the report continues, " constitute a fairly big region where this problem is essentially a common one and smoke emission is conspicuously high. It is therefore a particularly appropriate district for the formation of an active Regional Committee and it is a matter of great disappointment that one of the Authorities has not yet seen its way to take this view."

Most of the complaints which have been brought to the notice of the department have related to grit emission from boiler installations, coal and coke grading plants, and from the handling of pulverised fuel. The lack of demand for pitch and rising stocks have induced a number of manufacturers to employ it for steam raising. Some of the earlier attempts resulted in the emission of dense smoke and smuts, but improvement has resulted from attention to burner design and careful control of air supply. It is now perfectly possible and indeed relatively easy to burn such fuel without undue smoke emission.

Power Stations.

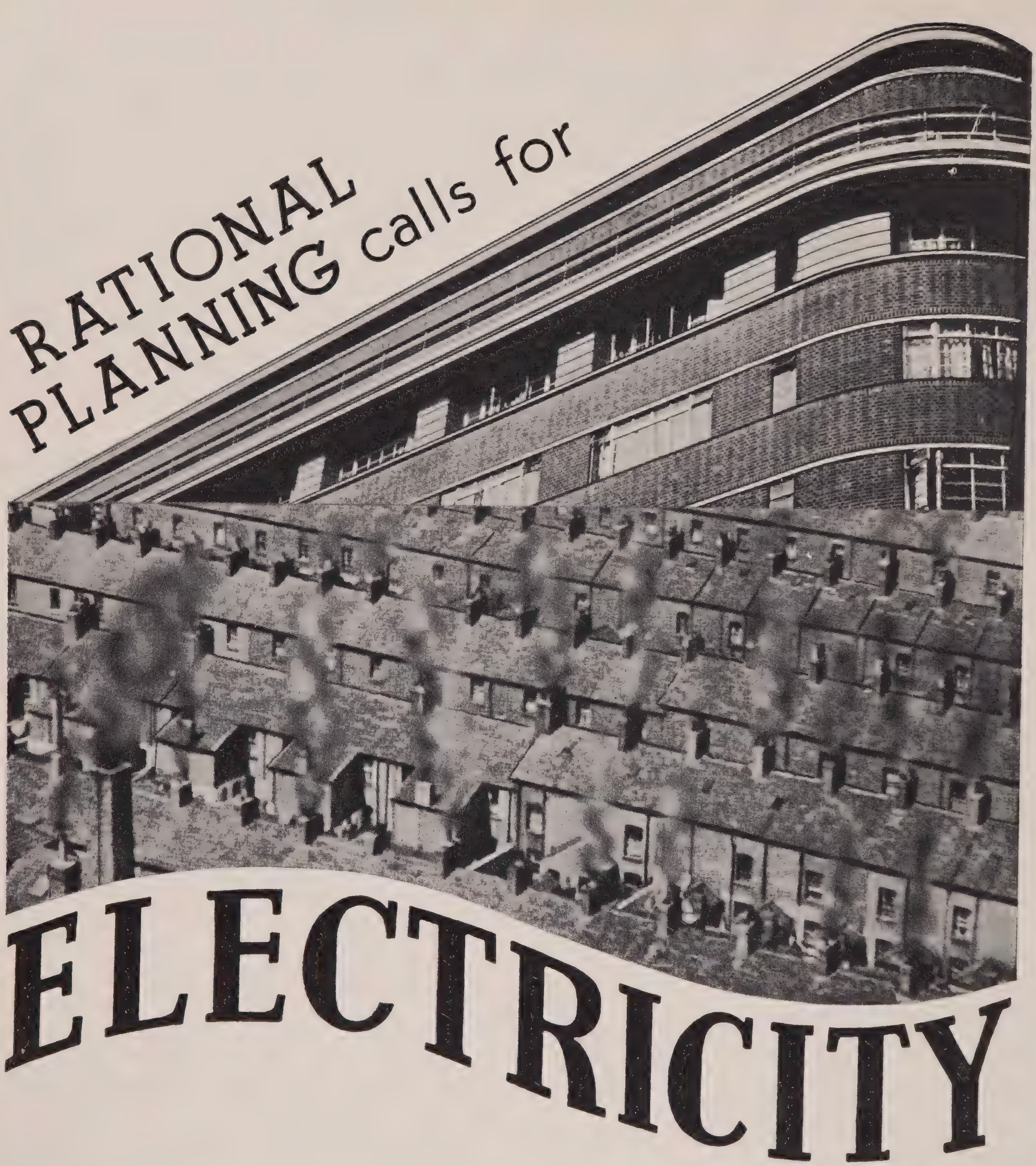
The report refers to the results obtained by the use of the gas-washing plant at the Battersea and Fulham Power Stations. At Battersea during 1937 480,133 tons of coal were fired, with an average sulphur content of 0.86 per cent. The average total acidity of the emissions, based on 879 works tests, was 0.032 grain (as S) per cu.ft. of dry gas at N.T.P. This is equivalent to 3,734 tons of sulphur eliminated. The gas-washing plant at Fulham has operated with even more remarkable efficiency. 270,190 tons of coal, with an average sulphur content of 0.89 per cent., were fired ; the total acidity of the emissions being 0.0063 grain (as S). As the concentration of the sulphur oxides in the gas is affected by the degree of dilution these averages may be corrected to a basis of 10 per cent. CO_2 in the gas, which gives a figure for Battersea of 0.026 grain, and for Fulham of 0.0050 grain. The sulphur eliminated at Fulham was equivalent to 2,371, making a total of 6,105 tons of sulphur, or nearly 19,000 tons of sulphuric acid prevented from being discharged into the atmosphere of London.

Further, it is pointed out that at such low acidities, the nitrogen oxides which are invariably present have an appreciable effect on the results. Samples have therefore been examined for total sulphur by the precipitation of barium sulphate and it has been concluded that approximately 20 per cent. of the total acidity is accounted for by oxides of nitrogen.

Burning Spoilbanks

The report draws attention once again to the problem of burning spoilbanks at collieries. All the complaints relate to spoilbanks in the north. It is believed that some in the midlands are also on fire although no complaints have been received. Those in South Wales are apparently less liable to spontaneous combustion.

" In a few instances," says the report, " colliery companies have specially deputed chemists to investigate the problem. The work could, however, be better carried out on a co-operative basis and it was with pleasure that it was learned that the Yorkshire Advisory Committee on Mining Research proposed to initiate research on the extinction and prevention of colliery spoil-heap fires and were seeking the co-operation of the Yorkshire coal owners. A programme of work is in preparation and it is sincerely hoped that the matter will be pursued with vigour. The proposal is a welcome sign that the Industry realizes the importance and urgency of the problem."



Smokeless power, fumeless heat, flameless light. Cleaner cities, healthier cities, happier people. The day is coming when we shall see all industrial and domestic labour transformed by electrical means.

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The conclusions arrived at after investigation of some 30 burning spoilbanks are summarized thus in the report:

1. Conical dumps are particularly liable to fire for the reason that the larger lumps naturally tend to roll to the bottom, thus producing a heap with an open base which allows easy access of air. It has been noted that the fires usually start at the bottom of these tips.

2. "Dry cleaner" refuse is more likely to fire than "wet cleaner" refuse. The reason appears to be that in the process of wet cleaning, blinding of carbonaceous particles with clay occurs.

3. Washery dirt by itself is safe, or may be incorporated with inferior coal provided that there is sufficient of it to produce a dense mass.

4. Stone and shale are safe by themselves, but if dumped with carbonaceous refuse they increase the porosity of the dump and thus increase also its liability to fire. If shale is placed on a hot dump it is likely to distil and provide additional fuel in the shape of gas and oil. As much stone and shale as possible should be retained underground and used for packing old workings.

5. For treatment of burning heaps, stone dusting (Price's method) or clay grouting is often effective.

6. The material most liable to spontaneous ignition is inferior (banded) bituminous coal and this liability is increased by the presence of pyritic material.

7. Efforts should be made to secure greater recovery of coal from the waste material. This involves crushing and cleaning with a resultant production of waste consisting of smaller particles with a lesser carbon content. It is believed that such recovery would at least pay for itself but capital would be required for the necessary plant.

Further problems dealt with under smoke abatement are those of smoke and fumes emission from coke ovens and low temperature carbonization retorts, the escape of excessive smoke from certain gasworks retort houses, grit from coke grading operations, and smoke from lime burning. In the last case it is said that the process can be and is effected smokelessly by using either producer gas or a mixture of coke and coal as fuel and by providing an adequate supply of secondary air, but it appears that certain limestones require special treatment particularly when a high grade product is required and in such cases it is difficult to avoid smoke production.

PROPOSED "SMOKELESS AREA" FOR MANCHESTER

DEPUTATION FROM THE SOCIETY. COAL TRADE OBJECTIONS

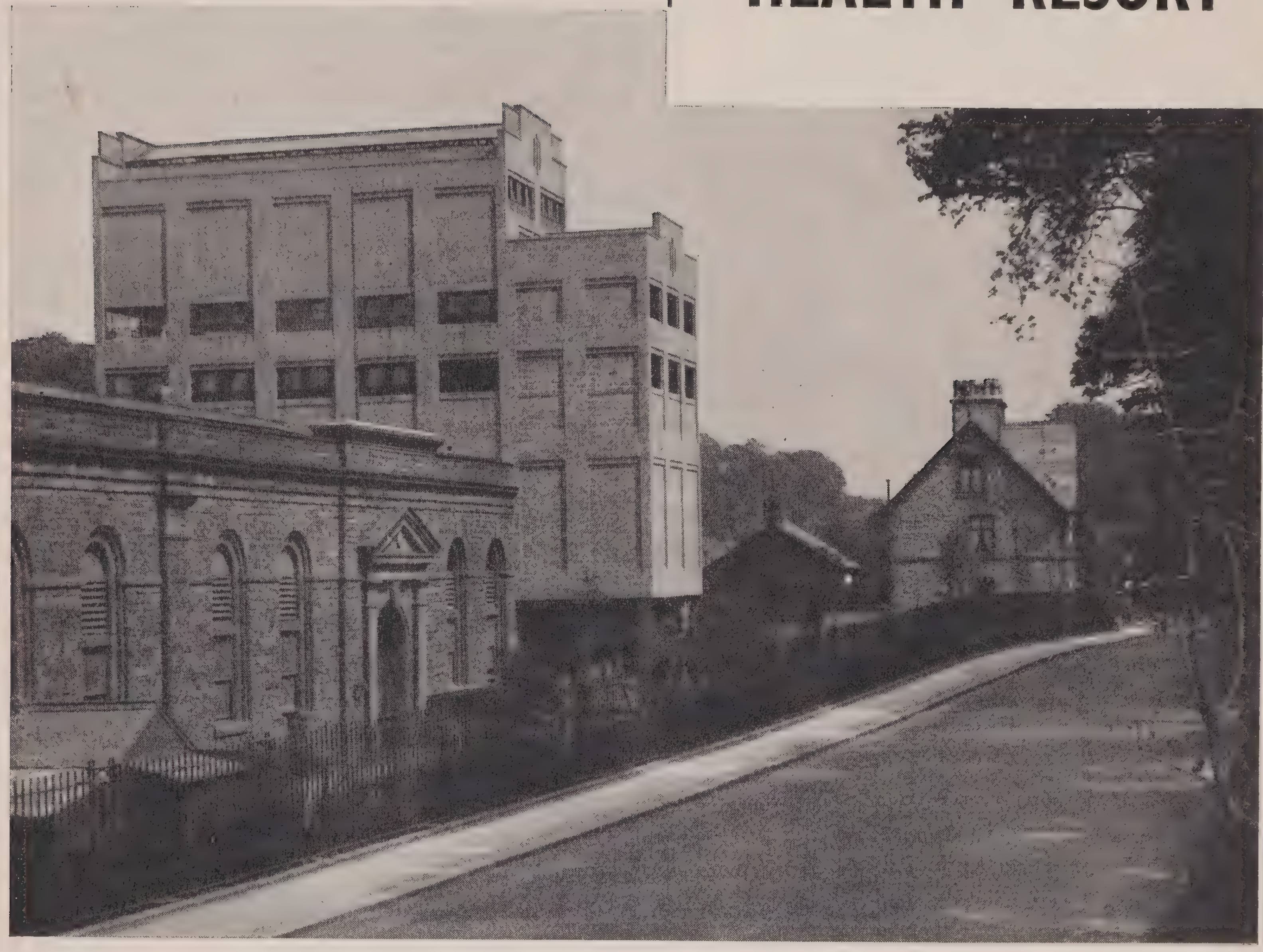
A deputation from the North-Western Branch of the National Smoke Abatement Society was received by the Manchester Public Health Committee on 17th May, 1938 for the purpose of introducing proposals for the establishment of a smokeless central area in the city. The deputation was headed by Sir Ernest Simon and included Miss D. Tripp (Joint Hon. Secretary of the Branch), Dr. E. H. Walker (M.O.H. for Stretford), Mr. Will Melland, Mr. Charles Gandy, Mr. L. M. Halliday (of the Manchester Society of Architects), Mr. N. McKellen (secretary of the Manchester and Salford Ratepayers' Association), and Mr. Arnold Marsh.

The deputation pointed out that it was estimated that "domestic" smoke was responsible for about three-quarters of the total smoke in the atmosphere. Such smoke was of a more injurious nature than industrial smoke since it contained because of the lower temperature of combustion, a greater proportion of tars and acids. The difficulties in any general attempt to control domestic or office smoke were twofold: the lack of sufficient smokeless substitutes for the fuel required and the difficulties of supervision. The only solution of both difficulties, it was insisted, was to experiment in a limited area.

The deputation thought that the proposed experiment should not include private houses, and therefore the central area, from which smoke came in large quantities from office fires and other sources easily capable of conversion, appeared most suitable. The suggested boundaries for such an area in Manchester were the River Irwell (from Hunt's Bank to a point opposite Quay Street), Quay Street, Oxford Street to its junction with Whitworth Street, Whitworth Street to London Road, Store Street, Great Ancoats Street (from Store Street to Swan Street), Swan Street, Miller Street (to its junction with Corporation Street, Corporation Street (from Miller Street to Long Millgate), Long Millgate (between Corporation Street and Victoria Station approach), and Victoria Station approach to the River Irwell, via Hunt's Bank.

In this area, it was pointed out, there were heating installations (some of recent date) the conversion of which would be unduly expensive. It was therefore proposed that the proper course was not that smoke should be absolutely prohibited within the area but that its emission should be a "smoke nuisance" under the Public Health Act, 1936. This would mean that while the mere emission of smoke would constitute the offence it would still be possible for the offender to prove that the best practicable means for preventing it had been used, having regard to cost and to local conditions and circumstances. In practice the police would not bring such offenders to court if satisfied they had a reasonable defence. Most of the smoke came, however, from office fires, the conversion of which would present no serious difficulty and expense.

HEALTH RESORT



AT BUXTON, as at all resorts similarly given over to the promotion of good health, purity of atmosphere amounts to stock-in-trade. In the choice of modernized gas works equipment a very big factor was the necessity for smoke-free operation. And, as at many other health centres, the chosen carbonizing plant was an installation of

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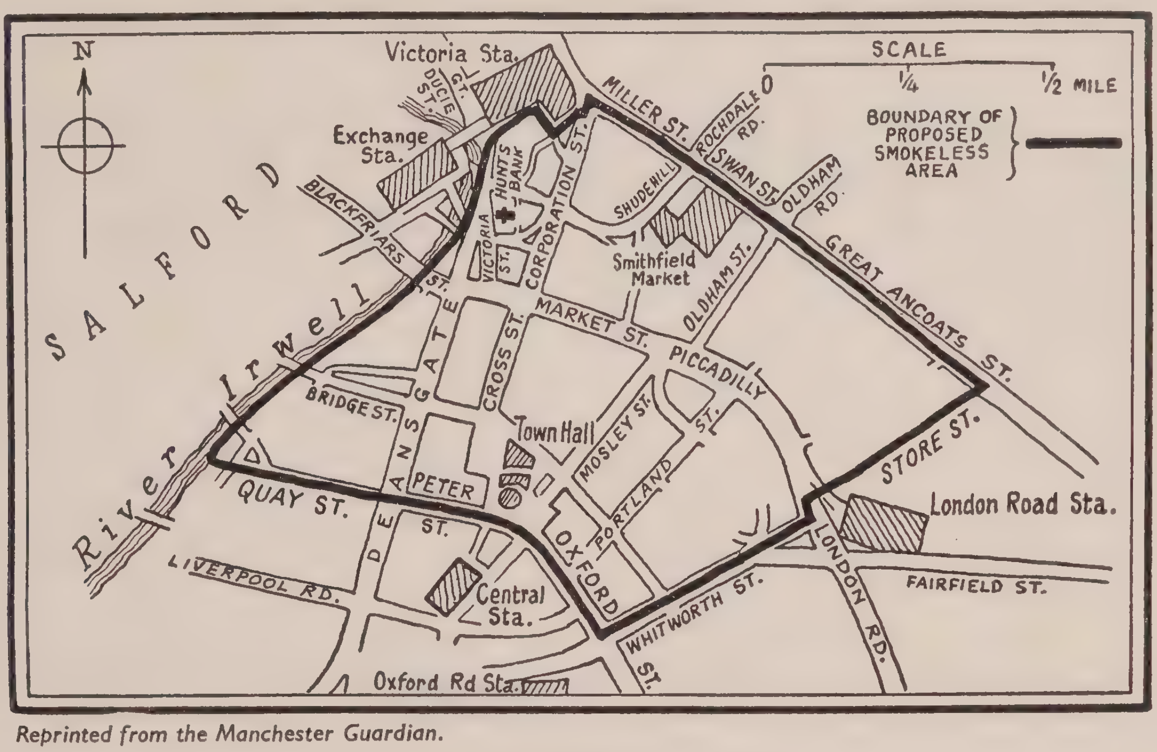

Reprinted from the Manchester Guardian.

Proposed Smokeless Area

Effect could be given to the proposal by a short special Act empowering the city council to make the necessary byelaws. The Public Health Committee approved in principle to the proposal and decided to call for a report from the town clerk and the medical officer of health on the legal and medical questions raised by the proposed scheme.

The Objectors.

On 12th July a deputation from the Lancashire and Cheshire Area Committee of the Coal Utilization Council waited on the Public Health Committee to protest against the proposed scheme. It was stated that if the proposed regulations were enforced they would involve the coal industry in a great loss and probably result in an increase of the price of coal to individual consumers of 3/- a ton. Railway revenue would also be adversely affected. It was further urged that the pollution of the atmosphere was being aggravated by the corporation's own policy of advising all householders to burn their refuse and that the coal industry itself was already spending £7,000 a year on research which was designed to reduce the smoke nuisance by discovering some method of quicker ignition. It is understood that the deputation was informed that while its case would be taken into consideration the objections were somewhat premature.

The deputation included representatives of Lancashire Associated Collieries, the North of England Coal Traders' Association, the Lancashire Area Council of the Coal Merchants' Federation of Great Britain, and the Coal Utilization Council.

FUEL ECONOMY AND SMOKE ABATEMENT

By W. H. GAMBLE, B.Sc.

At a meeting of the Midland Joint Advisory Council for Smoke Abatement held on April 28th, 1938, Mr. W. H. Gamble, B.SC., Assistant Chief Engineer of the Coal Utilization Council, gave an address on "Fuel Economy and the Utilization of Coal," with special reference to smoke abatement.

In his opening remarks Mr. Gamble emphasized that in the industrial field, at any rate, fuel economy and smoke prevention are, with very few exceptions, synonymous.

"It may be desirable," he continued, "to endeavour to arouse public interest in the reduction of atmospheric pollution, but I suggest that if we want to achieve anything practical it is advisable to spread information showing that fuel economy and smoke prevention go together. A manufacturer may be prepared to agree in theory that a smoky chimney is a nuisance; but if it is his own chimney, he is more likely to do something about it if it can be proved to him that smoke abatement will have a favourable effect upon his operating costs and his balance sheet."

The speaker then described the various constituents of coal and also the different varieties, with their characteristics.

Technique of Combustion.

Describing the process of gaseous combustion, Mr. Gamble said that the necessary conditions could be summarized as follows :—

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1. Sufficient quantity of air for complete combustion.
2. Intimate mixture of this air with the gas.
3. The mixture to be kept at a temperature high enough for ignition and continued burning.
4. Sufficient time allowed for the completion of the chemical reactions in the flame.
5. A combustion chamber large enough to prevent quenching of the flame.

The fundamental principles of gaseous combustion were few and simple, but their application presented many practical difficulties. If the air supply was too great there was a loss in furnace efficiency, and the cooling effect of this air might cool the gases below their ignition point. In extreme cases the excess air might so dilute the combustible gases that the mixture would not burn.

It was known from observation that liquids could only be mixed quickly when in a turbulent state and to a large degree gases had similar physical properties. Flue gas analyses showed that combustible gas and air could flow through a furnace in separate streams with the result that the gases had both an excess of air and unburned gas. This stratification could lead to smoke emission and was not infrequently an unsuspected source of fuel wastage.

A number of appliances were on the market for fitting to furnaces to promote turbulence and the majority were based on the principle of blowing air, which was generally pre-heated, into the combustion space. Steam jets or compressed air jets were both equally satisfactory for the purpose.

One great difficulty of the fireman was to know when the right amount of secondary air was entering the furnace particularly in the case of hand firing where the quantity should be progressively reduced after each charge of coal. On the other hand, an excess of secondary air could be equally harmful in lowering the furnace efficiency.

Mr. Gamble went on to say that the experimental difficulties in analysing the gases at positions in the fuel bed were very great, but the work of Kriesenger gave some indication of what took place. After the primary air had passed through a porous bed of burning carbon about 4″ of thickness no free oxygen remained. If the CO_2 first formed was now allowed to pass through a further thickness of hot carbon there was a certain amount of reduction to carbon monoxide. The 4″ thickness should only be taken as a guide as recent work on gas producers indicated that at extremely high temperatures the limiting thickness might be less than that.

The importance of that work was that it showed there was an optimum thickness of fire bed which gave complete combustion without forming combustible gas. The skill of a fireman lay in finding and maintaining the best thickness for the particular coal being burned. No specific figures for the best fire thickness could be given as it would depend on such factors as the size, ash and volatile content caking index and rate of burning of the coal. As a guide, when determining the best thickness the tests should start with :—

Small and slack coals ..	4″
Nut sized coal	6″
Cobbles and large	8″—10″

The Importance of Draught.

The function of the draught equipment, said the speaker, is to bring air into contact with the fuel and discharge the burned gases into the atmosphere. The amount of air for the complete combustion of a coal can be calculated from its chemical analysis, but a close approximation can be made from the fact that 7.65 lbs. of air will liberate 10,000 B.Th.U.'s. In practice a larger quantity of air varying from 10-15 lbs. per 10,000 B.Th.U.'s must be supplied.

For each ton of coal burned between 15 and 20 tons of air are used and this brings out the importance of having ample draught available in the furnace. In natural draught plants the chimney should be sufficiently powerful to allow the boilers to be worked with the dampers $\frac{1}{2}$-$\frac{3}{4}$ open. It is not uncommon to see boilers with the dampers always wide open and the firemen working the fires with rake and poker to keep the steam pressure. In effect the chimney is overloaded and there is every likelihood of heavy smoke. If given sufficient draught the same boiler would operate with much less smoke as sufficient secondary air could be drawn into the furnace to burn all the volatile matter.

Domestic Coal-Burning Appliances.

Mr. Gamble then referred to the research which had been initiated by the Coal Utilization Council with a view to reducing the smoke emission from the domestic fire. This research had already shown that more than half the smoke from an open fire was given off during the initial lighting period and a gas igniter had been developed for lighting the top surface of the fuel bed so that all the smoke evolved from the raw coal was burned in the gas flame.

The use of closed stoves, said the speaker, appeared to be increasing. They had a good thermal efficiency and when burning low volatile fuels were completely smokeless. Some makes were suitable for burning bituminous coal and as they were designed to give a closer approach to ideal combustion conditions than the open fire, troubles from smoke emission were not serious.

Thermal storage and closed cookers were smokeless, and other cooking appliances such as combination grates could burn a hard bituminous coal with little smoke when the dampers were used correctly. In the domestic field fuel economy could be secured by the installation of modern appliances.

Mechanical Stokers.

One of the greatest aids towards both fuel economy and smoke abatement, said Mr. Gamble, was the mechanical stoker. When it was desirable to burn bituminous coal underfeed mechanical stokers were used. The principle on which they worked was that of feeding raw coal into the bottom of a firepot immediately

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beneath an incandescent fire bed. The volatile matter was completely burned in passing through the hot zone of fire. These machines were always fitted with thermostatic controls which resulted in more efficient working than was the case with the majority of hand fired furnaces.

Automatic heating with smokeless fuels had been made possible by the introduction of the gravity feed boiler. High efficiencies were possible with this type of boiler and it had the further advantage that there were no moving parts with the exception of the forced draught fan on some makes designed for small sized fuels.

Economy in Industrial Plants.

In the case of steam plants savings could be made in three directions :—

1. Prevention of steam and reduction of heat loss in the works.
2. Reduction in fuel consumption per 1,000 lbs. of steam.
3. The use of appliances to burn cheap fuels.

The prevention of waste, which was largely within the province of the Works Engineer or Manager, often seriously affected the fuel bill. Cases had been met where the savings of steam in the works had relieved an overloaded boiler plant and this in turn had resulted in more efficient working of the boilers and elimination of smoke and grit nuisances.

Mechanical stokers were coming into more general use and some of the reasons for this were :—

1. Higher boiler efficiency than with hand firing.
2. Increased output from existing boilers.
3. The possibility of burning lower grade fuels.
4. Prevention of smoke.

In conclusion, Mr. Gamble said that when combustion engineers were employed to promote fuel economy, they were of necessity engaged on a practical problem of smoke prevention. The services of such engineers had made available to fuel users by the coal industry through the Coal Utilization Council, and they were doing practical and useful work in reducing atmospheric pollution.

REGIONAL COMMITTEE NEWS

Greater London.

A report was given in the last issue of the conference at the County Hall at which it was decided to set up an advisory Regional Committee for Greater London. A further meeting of representatives of the local authorities concerned was held at the Ministry of Health on 16th June, at which this new body was formally established with the name " Greater London Advisory Council for Smoke Abatement." 57 Authorities were represented, of which 33 had then agreed to join the Council.

Mr. E. H. Keeling, M.C., M.P., of the Westminster City Council was elected as Chairman, and by permission of the National Smoke Abatement Society, Mr. Arnold Marsh as Secretary. It was agreed that an arrangement be made with the Society for the use of office room at the Society's offices at Chandos House, Buckingham Gate.

It is hoped that the initial membership of the Committee will comprise : The London and Essex County Councils, 25 Metropolitan Boroughs, 23 other Boroughs, 9 Urban and one Rural District Councils. The annual subscription will be £4 4s. od. for the L.C.C., £3 3s. od. for other County Councils, and £2 2s. od. for all other Authorities.

The Council is at present forming a representative Committee for the purpose of drawing up a Constitution.

Bristol and District.

At a meeting of Local Authorities held in Bristol on 18th July, 1938, it was unanimously agreed to form an Advisory Regional Committee for Bristol and District. Eighteen Authorities were present from a radius of about 20-25 miles from the centre of Bristol, comprising three Boroughs (Bristol, Bath and Weston-super-Mare), nine Urban Districts and six Rural Districts. In the unavoidable absence of Mr. J. A. Robinson, Chief Sanitary Inspector, Bristol (who is a member of the Executive Committee of the Society), the formal resolution establishing the Committee was moved by Mr. F. J. Redstone, Senior Housing Inspector, Bristol, and seconded by Mr. A. Tyler, Chief Sanitary Inspector, Bath. In addition to delegates there were present many members of the Bristol Health Committee, Dr. A. C. Monkhouse, Inspector of Alkali, etc., Works, the City analyst, and members of the public.

Interest has been shown by the City of Gloucester, 34 miles from Bristol, and it is possible that the area of the Committee will be extended.

Midlands Joint Advisory Council.

Dr. Martine (Birmingham) Hon. Secretary, writes that a meeting of the Executive Committee was held on 28th April, Alderman Beavon (Warwickshire C.C.), in the chair. At a half-yearly Council Meeting which followed it was resolved after some discussion that the Council be named in future " The Midlands Joint Advisory Council for the Abatement of Smoke and Atmospheric Pollution." Thereafter Mr. W. H. Gamble B.SC., Assistant Chief Engineer of the Coal Utilization Council, gave a most stimulating paper on " Fuel Economy and Smoke Abatement," Lantern slides added

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The Report on atmospheric pollution issued by the Industrial Research Dept. gives the following figures for days of thick smoke haze for the two cities: LONDON 61%
CARDIFF - 0%

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greatly to the success of his address and the meeting only adjourned after a full and interesting discussion.

Dr. Martine reported at this meeting that fifty-two Sanitary Inspectors had attended a course of lectures and demonstrations given by Mr. Farquharson (Birmingham) and himself, qualifying them to sit for the Smoke Inspector's Certificate of the Royal Sanitary Institute. An examination was to be held in Birmingham in June.

West Lancashire and Cheshire Regional Smoke Abatement Committee.

The annual conference of the West Lancashire and Cheshire Regional Smoke Abatement Committee was held in the Municipal Annexe, Liverpool on June 15th, 1938.

In reviewing the work of the past year the Hon. Secretary (Dr. W. M. Frazer, M.O.H. Liverpool) emphasized the marked improvement which had taken place in the reduction of the amount of smoke produced from small boiler plants by the installation of mechanical stokers. In addition to abating the nuisance from excessive smoke by inefficient hand firing, the owners of these plants had found a substantial saving in the cost of fuel.

At the Ideal Home Exhibition to be held in Liverpool in September next a section is being allocated to smoke abatement. The West Lancashire and Cheshire Regional Smoke Abatement Committee are co-operating with the promoters and are loaning models, photographs, etc.

Smoke Abatement and Fuel Economy classes held during the winter months of 1937/1938 were attended by 35 students. An examination was held at the conclusion of the session and certificates of proficiency were issued to successful candidates.

At the conclusion of the meeting the members made a visit to the Garston Gas Works (Liverpool Gas Company) where the various plants and the making of smokeless fuel were demonstrated.

The West Riding of Yorkshire Regional Smoke Abatement Committee.

The Report of the Executive Committee for the year 1937/38 was submitted to the Annual Conference of the Committee, held on 10th June, 1938. The report refers to the further reduction of constituent authorities owing to the effects of the West Riding Review Order, 1938. The area covered by the Committee now consists of 49 authorities as against 62 at the date of the last conference. Since the inception of the Committee in 1925 the constituent local authorities have been reduced by no less than 52.

The report refers to the questionnaire sent to all constituent authorities asking how many certificated stokers were employed in the area, and how their work compared with that of uncertificated. "The results," it is added, "were far from reassuring. In the first place, only a fraction of the authorities replied, and in the second those who did reply did not give the information in the form desired. It must be admitted in extenuation that the information asked for was difficult to obtain with complete accuracy. From the replies received it appeared that the total number of certificated stokers in the area was much below what was anticipated and the ratio of uncertificated to certificated was disappointingly high. Moreover, it transpired that even in those areas where propaganda in favour of smoke abatement had been most active and where attendance at classes had been well maintained there still remained a large number of men who had had no systematic instruction in the subject of boilerhouse practice."

Examinations were held at the four centres (Leeds, Bradford, Halifax and Batley) and 41 students entered of whom 26 (or 63 per cent.) were successful in obtaining the Committee's certificate.

NEWS AND VIEWS

The Decay of Building Materials.

A paper was read to groups of the Society of Chemical Industry on 2nd May, by Mr. Thomas McLachlan on "The Decay of Building Materials with Special Reference to Microbiological Agencies." The action of bacteria and other organisms on stonework has previously been investigated but in this paper it is claimed that this is the principal cause of decay, and that the action of acid-laden soot deposit, derived from smoke, is not a primary cause of decay. The author is critical of customary statements on the effects of smoke, both in the books that have been written on the subject and in the literature issued by the National Smoke Abatement Society, although he states that this must not be taken as suggesting that he is in any way opposed to recommendations with regard to the clearing of the atmosphere.

It may be agreed that microbiological action is to some extent responsible for decay, and that deposits and blackened surfaces may on occasion be moulds formed by organic action, but it is difficult to see why this should disprove, as appears to be implied by the author, the usually accepted statement of the direct chemical attack by sulphur acids upon the stone.

It is admitted in the paper that town buildings do blacken and decay more quickly than do country buildings, and this is attributed to the encouragement of the growth of micro-organisms through the reduction in ultra-violet radiation (due to smoke) and through the presence of more food material in the form of atmospheric impurities. The ultimate responsibility for the decay of stonework would therefore appear to be due to a polluted atmosphere in either case, and the question

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resolves itself as to whether this is by direct chemical action or through the intermediary action of micro-organisms.

It is hoped that Mr. McLachlan's thesis will be given the expert attention it undoubtedly requires with a view to determining the extent to which it is valid.

Mr. McLachlan also claims that the sooty appearance on the surfaces of leaves is due to a mould and that this has probably misled some investigators who have regarded the mould as true soot. Again, this may be true, but the inference which the author appears to wish should be drawn, that soot deposits on leaves, even in smoky towns, are not to be found, cannot be easily accepted, and there appear to be no grounds for amending the general exposition of the attack of atmospheric impurities upon vegetation as shown by the work of Cohen and Ruston.

The Housing Centre.

We have received a copy of the Annual Report of the Housing Centre for 1937-38. In addition to reporting the many activities of this very live organisation the report gives a useful bibliography on housing and town planning and an informative summary of the facts concerning housing subsidies, grants and loans. The activities of the Centre include exhibitions, tours, lectures, midday lunches, film shows, and an information bureau. There is a keen interest among its members in smoke abatement in relation to housing and urban amenities, and by friendly contact between the Centre and the Society it is hoped that this interest may be extended.

Gas Analysis.

Readers concerned with combustion technology, either in the laboratory or in the boilerhouse, will be interested to learn of an excellent new textbook, " Gas Analysis," by A. McCulloch, M.SC.TECH., A.I.C., F.INST.F. (H. F. and G. Witherby, Ltd., London, 7/6 net). Mr. McCulloch is a member of the Executive Committee of the Society.

The accurate and rapid analysis of gases frequently plays an important part in problems and investigations arising from the combustion of fuel, and Mr. McCulloch's book will be of value to most workers in spite of his statement that it has been written primarily to meet the need of students taking laboratory courses in gas analysis.

The book describes the construction and manipulation of five well-known types of gas analysis apparatus which are in common use, each of which has a well-defined range of application. Chapters are also included in miscellaneous determinations and the determination of the calorific value of gases, together with matter relating to the sampling of gases and absorbents used in gas analysis.

Coal's Three Phases.

" It is clear that we are entering on a new phase as regards coal. In the first, pre-industrial stage, coal was little more than a curiosity—a combustible mineral which here and there was used in preference to wood. In the second phase, coal became the mainspring of industry, but was regarded simply as a fuel. In the third phase, now dawning, we must accustom ourselves to think of coal as a raw material generally demanding special treatments for its proper utilization. The new concern for health and social welfare is demanding that methods for preventing smoke shall be adopted, even if at some economic sacrifice. Coal owners and public alike must learn to regard coal as a store of riches which it is for science and technology to unlock and make available."—*Editorial in " Nature."*

Order or Chaos in the Coke Market ?

Coke is one of the most important of smokeless fuels, and with low temperature fuels and the natural smokeless coal it will play an increasingly important part in the change-over to smokeless methods in the many cases where solid fuels are necessary and where it is desired to retain the open fire. There are many problems bound up with the production and marketing of coke, both from gasworks and coke-ovens. What should be the policy for the future ? How may present difficulties and anomalies be overcome ? Should there be further co-ordination between the gas undertakings, and should there be co-ordination and a planned policy between the gas and the coking industries ? The whole position is admirably summed up in a recent publication " Order or Chaos in the Coke Market," which is a reprint of a series of articles that appeared in the *Gas Journal*. The pamphlet, priced at 3d., may be obtained direct from the *Gas Journal*, 11 Bolt Court, Fleet Street, E.C.4., and should be read by all who are concerned with smoke abatement and who wish to obtain a clear idea of the marketing position and possibilities in respect to one of the principal smokeless fuels.

An Interesting Covenant.

An important and significant covenant is used in leases for factories and similar premises in the Team Valley Estate of North Eastern Trading Estates, Ltd. This reads as follows :

" To construct all furnaces, ovens, chimneys and other plant and apparatus upon the said premises in which a smoke producing fuel is to be consumed on the most approved principle in use at the time when the same shall be respectively erected and in particular so as to secure to the greatest possible extent the consumption on the said premises of all smoke or vapour arising therefrom and with a view thereto to use and work the same in the most efficient manner.

" On a written notice being served on the said premises by the Estate Company's Surveyor requiring the abatement of any undue emission of smoke or vapour within two hours of the service of such notice to abate the same accordingly."

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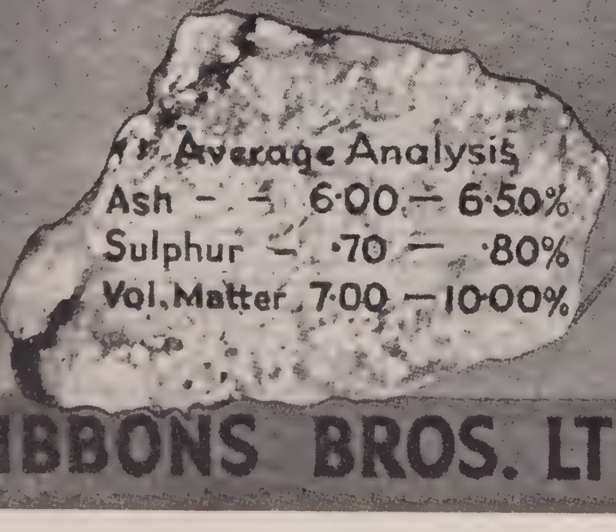

Average Analysis

Ash	6·00 — 6·50%
Sulphur	·70 — ·80%
Vol. Matter	7·00 — 10·00%

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Railway Smoke.

In the Society's Memorandum on Railway Smoke, which was sent to the principal railway companies, mention was made of the possibility of using locomotives fitted with steam accumulators for shunting purposes. This statement was criticised at a recent meeting of the Council of the Society, and accordingly inquiries regarding the use of such locomotives were made. A letter from the office of the Chief Mechanical Engineer and Electrical Engineer of the London Midland and Scottish Railway contains the following information: "While it is possible to use locomotives operated on steam which is stored and not generated, these locomotives are of small size and are only used intermittently, and are able to draw their steam frequently from a large boiler installation. There is a locomotive of this kind shunting in the yards of one of the large biscuit factories in the country, but the sort of shunting it has to do is very different from the continuous and heavy shunting that is required in railway goods yards and sidings."

Modern Fuels, Ltd.

24 of the ovens of Modern Fuels Ltd., a low temperature carbonization process at Seaham Harbour, were opened in April last. The company was incorporated on 19th July, 1937, for the manufacture of smokeless fuels and other products, and has an issued capital of £70,000 fully paid. The company, which was formed with the assistance and collaboration of the Nuffield Trust for the Special Areas and the Treasury, took over the whole of the assets of Coal and Allied Industries, Ltd., at Seaham Harbour. Output, which has now begun, is approximately 200 tons of fuel a day, and the labour required for the first unit exceeds 250 men and boys. 16 gallons of tars are obtained from each ton of coal processed, and refineries are already installed. Mr. Harry Lane, the chairman and managing director of the company, in lighting the ovens, said that the company were of the opinion that they would produce at Seaham the finest domestic fuel it was possible to get at the moment.

Trade Union Approved Societies.

At the Annual Conference of the National Association of Trade Union Approved Societies, held at Eastbourne in June, a resolution was passed urging the extension of legislation to deal with the nuisance of smoke from domestic as well as industrial sources.

Sunshine in Salford.

The report dealing with sunshine records in Salford for 1937 states that the figures show very considerable screening of daylight by smoke clouds, especially in the winter months. The sulphur pollution records show exceptionally high figures on foggy days, " thus demonstrating the tenacity with which smoke pollution hangs over the city during those periods."

New Sun Heaters.

The outstanding feature of Messrs. Smith and Wellstood's stand at the Building Exhibition will be their New Sun Heaters, which are specially designed for factories, commercial garages, and other spacious buildings. Simplicity of installation is paramount, for the expense of piping systems is avoided by these heaters, available in various sizes to heat up to 100,000 cubic feet. This continuous-burning stove, in which anthracite, coke, or other solid fuels can be used, heats the entire premises by warm air circulation. The heat from the fuel encircles the interior of the heaters to give a maximum calorific radiation without waste of heat up the chimney. A humidifier built into the heater prevents a dry atmosphere. An outer jacket prevents workmen in the immediate vicinity experiencing undue warmth.

At the same exhibition the Esse Cooker Company of which Messrs. Smith and Wellstood, are the proprietors, will show a new heat storage cooker, known as the " Esse Fairy," which has, unlike the other well-known cookers of this type, been designed for the smaller home. A water heater can be included if desired.

An American Conference.

The 32nd annual convention of the Smoke Prevention Association of the U.S.A. was held in Nashville, Tenn. from 17th to 20th May last. One of the most important sessions was a conference of smoke inspectors and members of the Standards Committee of the association with representatives of the coal and coal equipment industries.

Proposals were made to co-ordinate the work of many groups in an effort to determine more effectively a method to establish governing installations of equipment, the equipment itself, and proper and reasonable definitions of what constitutes a public nuisance insofar as smoke abatement is concerned.

Join the . . .

NATIONAL SMOKE ABATEMENT SOCIETY

BRANCH ACTIVITIES

THE SCOTTISH ANNUAL CONFERENCE

The Annual Conference of the Scottish Branch of the Society was held in Glasgow on 17th May, 1938, at which there was considerable discussion on and crtiicism of the Scottish Oil from Coal Committee's report, which had rejected all proposals for supplying Scotland with smokeless fuel and increasing the supply of home produced oil bv means of low temperature carbonization processes. The matter is also dealt with in the Annual Report of the Branch. The Duke of Montrose said that although the Committee had sat for three years and six months and imagined all manner of difficulties that might hinder the development of low temperature carbonization they did not, or could not, put forward one single suggestion that was helpful or might solve a single problem.

Sir D. M. Stevenson, in the discussion, said that it was idiotic to say that the manufacture of smokeless fuel was uneconomic when they had the evidence of an English company being able to show a profit of 8½% on an enormous capital outlay.

Later in the day a paper was read by Mr. A. L. Thomson, Chief Sanitary Inspector of Motherwell and Wishaw on "The Problem of Outdoor Air Hygiene." A long tolerance of aerial filth in this country had produced an unthinking acceptance of it as an inevitable concomitant of industrial civilization and urbanized living. Smoke pennants from works' chimneys were regarded as the streaming banners of prosperity. The pollution of the atmosphere was a graver violation of natural right than the pollution of a source of water supply, because we had to breathe the air in which we lived.

In a paper on "Public Health Administration and Smoke Abatement," Dr. A. S. M. Macgregor, Medical Officer of Health for Glasgow, revealed that the soot deposit in Glasgow in 1936-37 amounted to 231 tons per square mile as contrasted with 100 tons at Loch Katrine. Although the figure was large it represented only half of what it was 20 years ago. The changes in the amount of atmospheric pollution were mostly attributable to a lessened production of industrial smoke. What changes, if any, had taken place in the contribution made by domestic smoke could not be stated, but there was little doubt that the clearance of congested tenement areas under the Housing Acts had tended to lessen at least the concentration of smoke in many areas in the city.

The Annual Report contains the following interesting and illuminating paragraph :

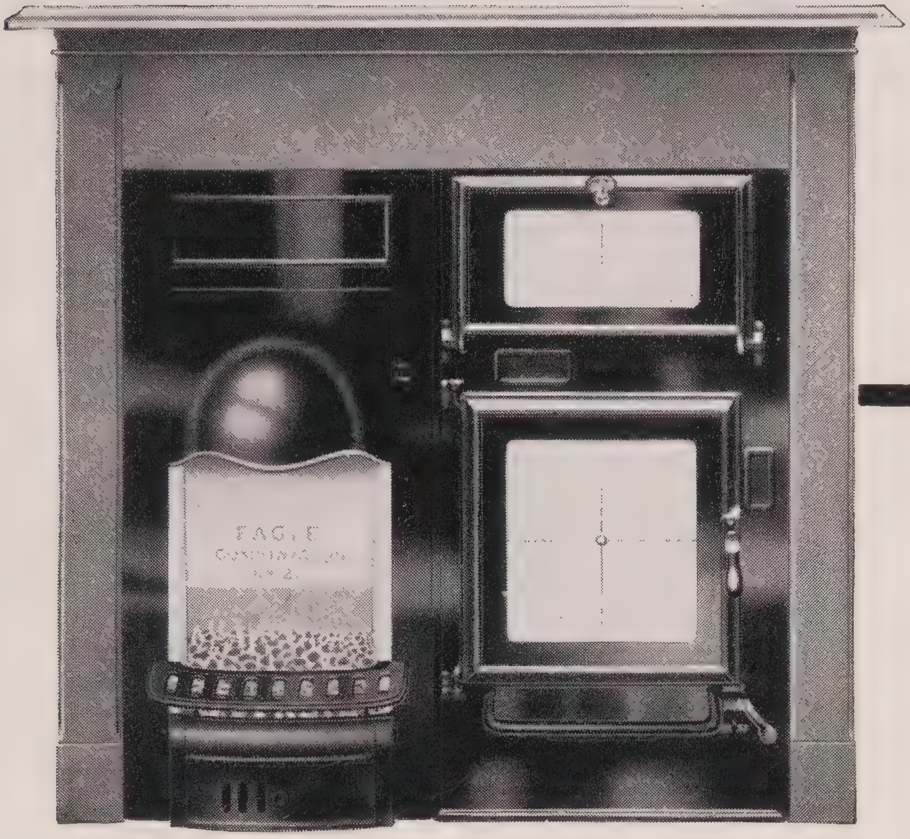
"In the report for last year attention was drawn to the apathy of local authorities of many holiday resorts in the matter of a pure atmosphere. Many of these authorities seem to be of the opinion that because their towns are situated on the coast, that of itself provides sufficient attraction and adequate recuperative properties to persons who sojourn there for recreation or convalescence forgetting the fact that only when the wind is coming from the sea in sufficient force to blow away the smoke cloud is their "health resort" any whit better from the point of view of clean air than the home towns of many of the visitors. For the purpose of interesting some of the larger holiday places in the abatement of atmospheric pollution, a communication was sent last year inviting them to become associated with the Scottish Branch of the Society in the work of cleaning up the air. It is to be recorded with regret that not one of these local authorities accepted the invitation—indeed, some of them did not reply—yet all are extensively advertised as health resorts, for the purpose of attracting summer visitors and convalescents."

North-Western Branch.

Members of the Branch visited the Gas Works at Partington on Saturday, May 28th, 1938, by invitation of the Committee of the Manchester Corporation Gas Department. A special bus was provided to transport the members from Manchester to Partington and back. Mr. Holton—the Chief Engineer—welcomed the guests on behalf of the Committee. The visitors were shown over the works, and were afterwards entertained to tea. After tea, Mr. Holton gave a short talk on coke fires, and Miss Robinson gave a short talk on gas fires.

The works are in the country, and as the weather was fine, a most enjoyable and instructive afternoon was spent inspecting the plant in operation. The layout of the works is excellent and has been planned to provide for extension when necessary. The Gas Department, who are supporters of our movement, also practice smoke abatement, and not a vestige of smoke was to be seen issuing from their works. Here is an example of a works going out into the country without polluting the country atmosphere. If all industrial plants followed the example of this works much of the work of the Society would have been accomplished. In striking contrast to these works, were the chimneys of an adjacent steel works and tar distillation plant, from which were seen volumes of smoke being discharged into the atmosphere.

Mr. Charles Gandy, the Chairman of the Society, expressed the thanks of the visitors for a delightful afternoon and an excellent tea, to Mr. Holton, Mr. Walker (Works Manager), Miss Robinson and the guides. Mr. Gandy said that they were looking forward to a smokeless Manchester, and an extension of the Partington Works in the near future. In reply, Mr. Walker expressed the hope that the members of the Society would again visit Partington Works.



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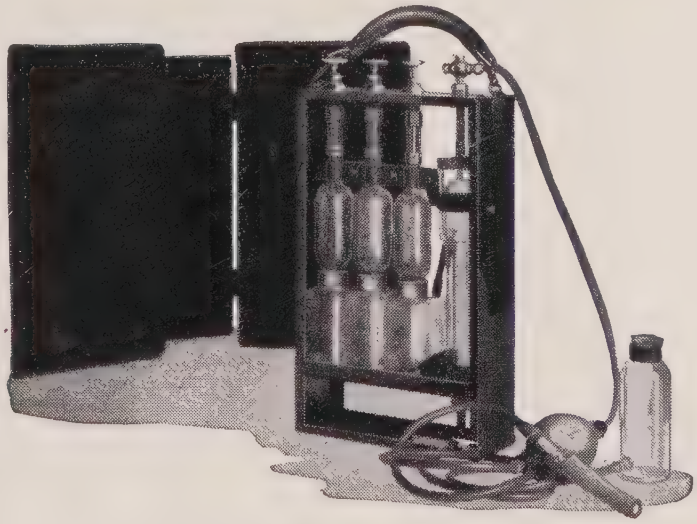

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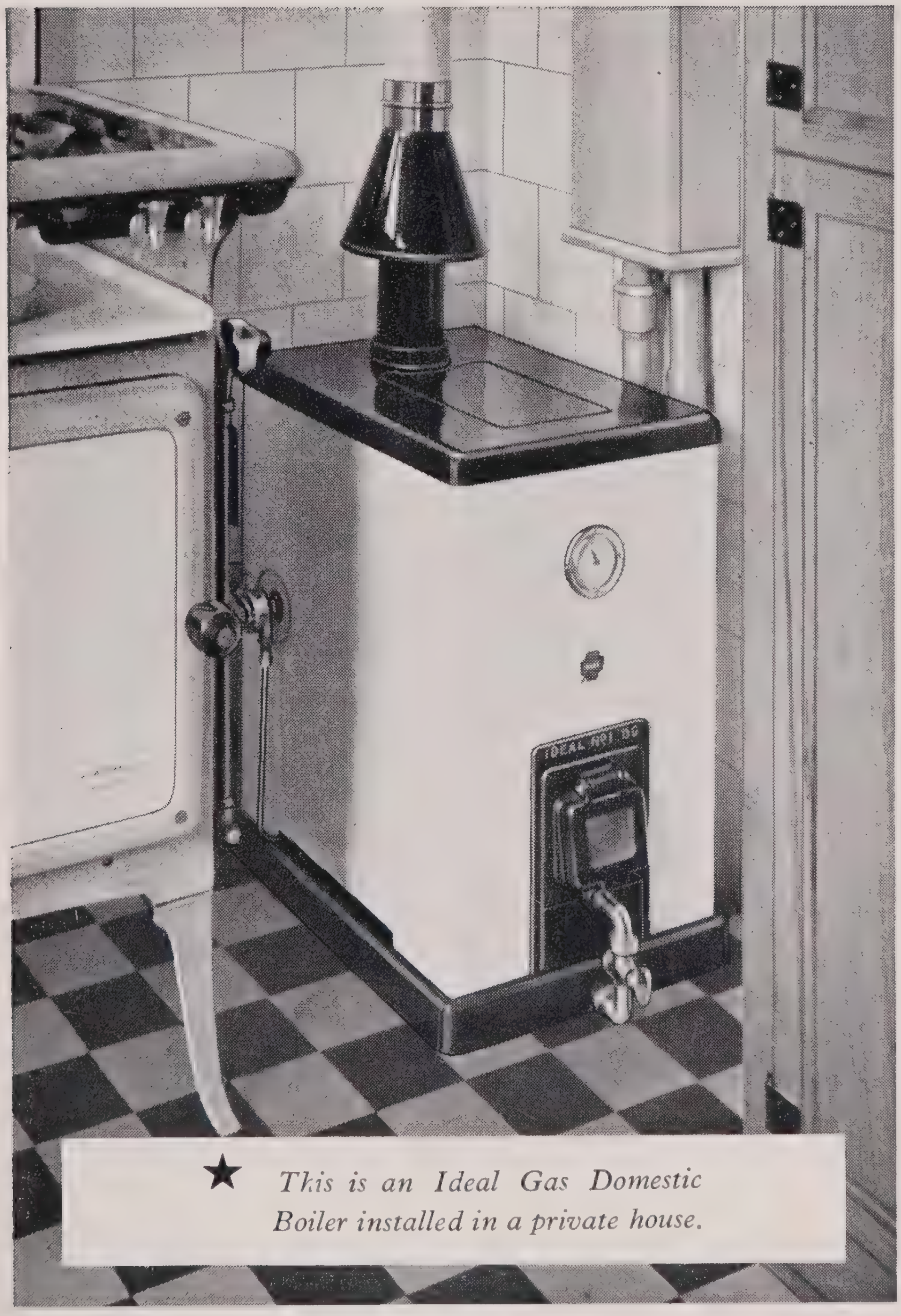

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and printed by J. Bentley & Sons, Albion Works, Todmorden.

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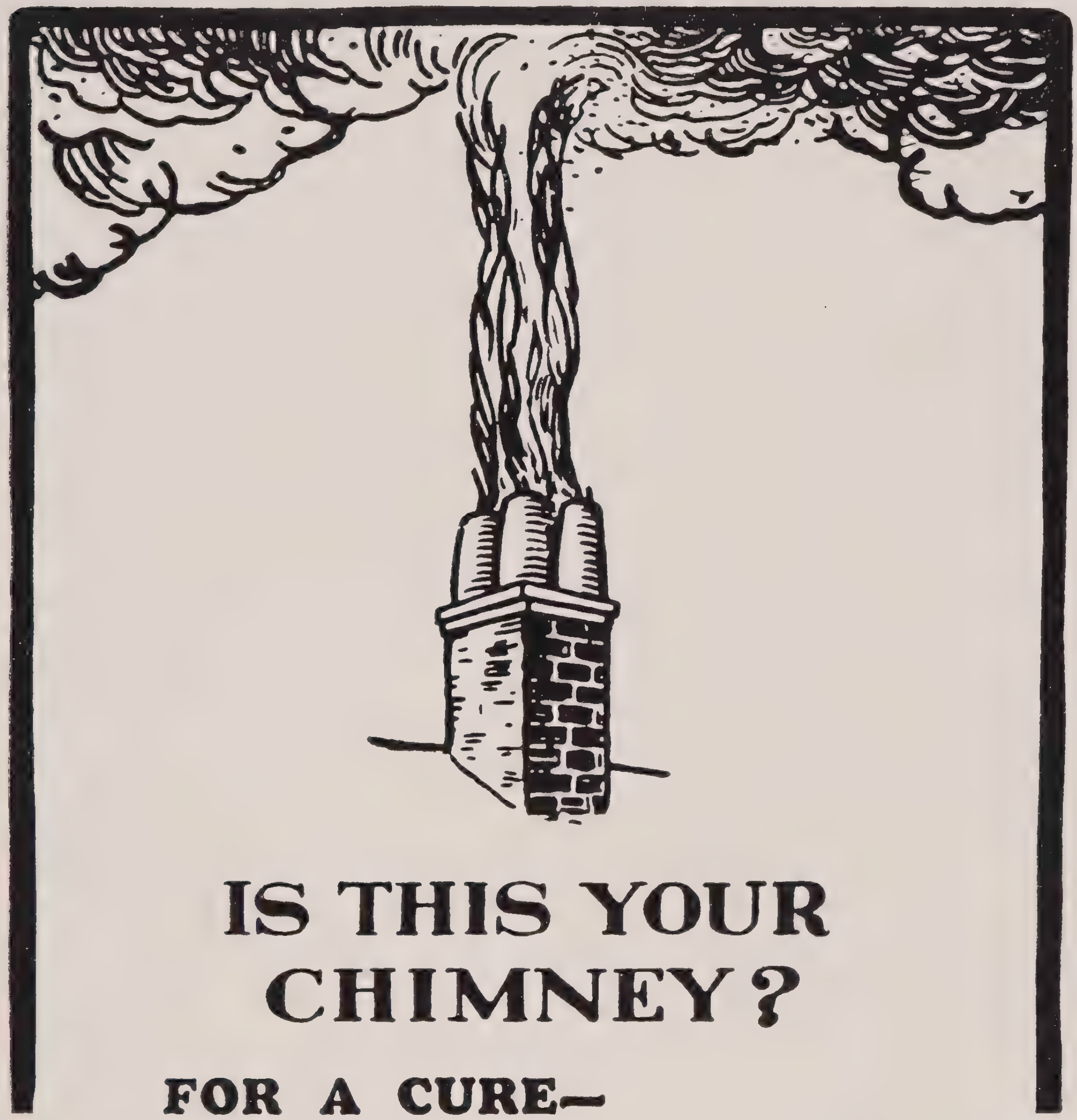
THE JOURNAL OF THE
NATIONAL SMOKE ABATEMENT SOCIETY

VOL. IX
NO. 36

NOVEMBER
1938

PUBLISHED
QUARTERLY
2/6 a year

SMOKE *Public Enemy No. 1*



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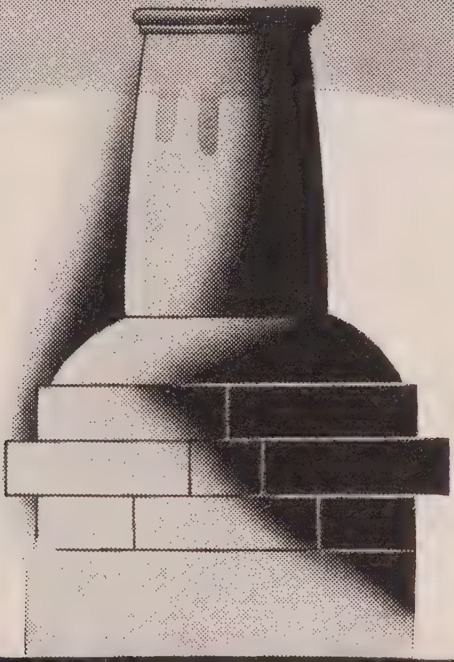

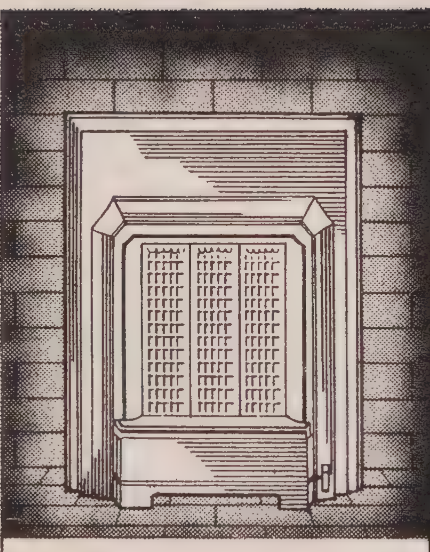

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The Journal of the
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Telephone : Blackfriars 3313

Vol. 9. No. 36.

November, 1938.

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The Journal is open for free discussion of all aspects of the smoke problem, and the opinions expressed in contributed articles are not necessarily the same as the views of the Society. Quotations and abstraction of matter appearing in the Journal is welcomed, provided the usual acknowledgements are made.

COMMENTARY

SEPTEMBER 29th, 30th and October 1st proved to be the most unsuitable days of any in the year for the holding of the Society's annual conference at Cardiff. Almost as soon as the last arrangements had been made, and the conference papers dispatched to delegates, postponement became inevitable. But it has been only postponement, and what then seemed to be undue optimism in asking delegates, in the postponement notice, to retain their conference papers on hand as it was hoped that it would be possible to hold the conference later in the year, has proved to be a justifiable request. The new conference has been arranged for 1st, 2nd and 3rd December, dates which it is felt are reasonably secure for the discussion of projects for benefiting mankind.

It is anticipated that the same programme will be possible, beginning with the Lord Mayor's Reception on the Thursday evening and concluding on the Saturday with the luncheon of the Monmouthshire and South Wales Coalowners' Association. Curiously enough, for the first time for many years no Saturday afternoon motor tour was arranged, and in the circumstances this is perhaps as well.

We are pleased to publish in this issue an account, much abbreviated though it is, of a paper on the development of the flue-gas washing plant at the Fulham Power Station, by Dr. R. Lessing, who is so well-known to the members of a Society he has for many years been helping and advising. To appreciate the brilliance of this work it is necessary to try to visualize both the purity of the gases when finally they pass out into the atmosphere and the gargantuan scale of the undertaking. The thousand million cubic feet of gases washed every day are equivalent in volume to a column ten feet diameter and over 2,500 miles long. With most things the cry is that they must be bigger and better, but here the biggest is the best, and instead of development upwards to a larger scale what is now wanted is development downwards to a smaller scale. Dr. Lessing says little about the economics of the process, pointing out that the first consideration was to get it working satisfactorily, and it may well prove that cost would make such a process difficult to adapt for use on a smaller scale where the necessity for such thorough washing is not so acute. Nevertheless this process shows what can be done when it has to be done, and it would be a pity if the experience gained in bringing the process to such success could not be utilized in other directions. Complete, smokeless combustion at a generating plant such as Fulham is a *sine qua non*, and when it is coupled with such complete cleaning of the flue gases, bituminous coal can be looked upon as almost as guiltless of atmospheric pollution as the electricity it generates.

There is still a feeling of diffidence about looking too far ahead, but for a moment forgetting the mishap of the 1938 Conference it can be announced that for 1939 new ground will be broken by visiting for the first time a seaside resort. An invitation has been received from the Blackpool Corporation, and it is expected that the conference will take place towards the end of September. The principal reason for leaving, for a year, the larger industrial towns and following the example of most other conferences, is not a desire to enjoy the sea, the fun of the fair, or even the famous illuminations, but to give point to a session that will discuss the rather important question of smoke abatement in relation to health resorts.

It may seem axiomatic that health resorts should be as smokeless as possible, but actually there seems to be very little interest taken in the problem by either the authorities or by those who depend upon the amenities of their town for their livelihood. Seaside resorts have a natural advantage of having a vast smoke-free area on one side of them, and of frequent breezes to blow their own smoke inland. Nevertheless the atmosphere is not always scavenging efficiently and any town may be shrouded in a pall of smoke from its hotels, boarding houses and lodging houses, and not infrequent industrial premises. The natural urge of town-dwellers to go during the summer to the hills, the countryside, or the seaside, is intensified by the desire to enjoy real cleanliness of surroundings and real brilliance of sunlight. The health resorts, in their own interests, should see that they can guarantee these conditions.

Readers may be interested to know of a minor activity that has recently been begun. During the last year or two there appears to have been a decided increase in the number of press cuttings relating to smoke nuisances, usually in reports of Town Council Meetings, but sometimes in the form of letters to the editor, petitions, and actions in court. There has also been an increase in the number of letters of complaint, or requests for advice or assistance, received by the Society. A record has therefore been started of the essential facts of all these cases in the hope that, from year to year, statistical information of value may be obtained. The information will be more likely to give facts as to the concern of the public and of local authorities about smoke nuisances rather than facts as to the actual extent of distribution of nuisances, for a small, clean town may (and often does) give much attention to a nuisance that would perhaps pass unnoticed in a factory town where often, unfortunately, standards have for long been degraded. In time, the records may give us useful data on the particular kinds of nuisance that arouse most concern, even though what causes most annoyance may not be actually the most serious type of nuisance.

BRITAIN'S BURNING SHAME

AND THE GAS CAMPAIGN

As readers of the *Journal* will have received a copy of the Society's new popular booklet " Britain's Burning Shame," it is unnecessary to review it at length in these pages. The booklet is different from the usual publications of the Society and in it there has been attempted an appeal by means of illustrated " human interest " descriptions of the problem of smoke. The booklet has been prepared with the object of bringing smoke abatement home to those who are not reached by the Society's more sedate publications or even by the necessarily brief reports of our activities in the press. If, by chance, any of our members should have felt that " Britain's Burning Shame " is too popular in its method of presenting the smoke abatement case all that need be said is that it is not intended for the already converted. It supplements, but in no way displaces, our conference reports, the *Journal*, or the invaluable " Case Against Smoke."

The new booklet is an expensive publication and it has been possible to issue it only because of a request for such a publication, and an agreement to purchase a large proportion of the printing, by one of the Society's members. The suggestion was made because, for the first time, one of the large industries concerned with smokeless mediums, the gas industry, had arranged to make smoke abatement the main theme of an intensive advertising campaign.

This campaign, which we hope will be the first of many to be conducted by all the industries interested in smokeless methods, will naturally help in a new way to bring home to the public the advantages of the smokeless home and the smokeless town. Smoke abatement propaganda is in no way the preserve of the Society, but the Society, as the one national organization devoted to the problem, is inevitably interested in and grateful for anything that is done by others to promote its objectives. It has therefore done all that is proper for it to do in assisting the gas industry on this occasion, and welcomed the opportunity of publishing a booklet of a kind that had hitherto been beyond its resources. It need hardly be said that in the first place it was made clear that the booklet could not in any way indicate any preference for gas as a smokeless medium. The booklet advises those who want to make their homes smokeless to consult their local fuel merchants or their gas or electricity showrooms, but apart from this it is concerned solely with the effects of smoke and the advantages of abolishing it.

The booklet is being distributed by the gas industry, with literature of their own, but is also being used in a similar way by other industries and Public Health Departments of Local Authorities, and individual members of the Society are also distributing it. Members who can sell, or usefully give away free, are asked to write for copies.

The New Exhibit.

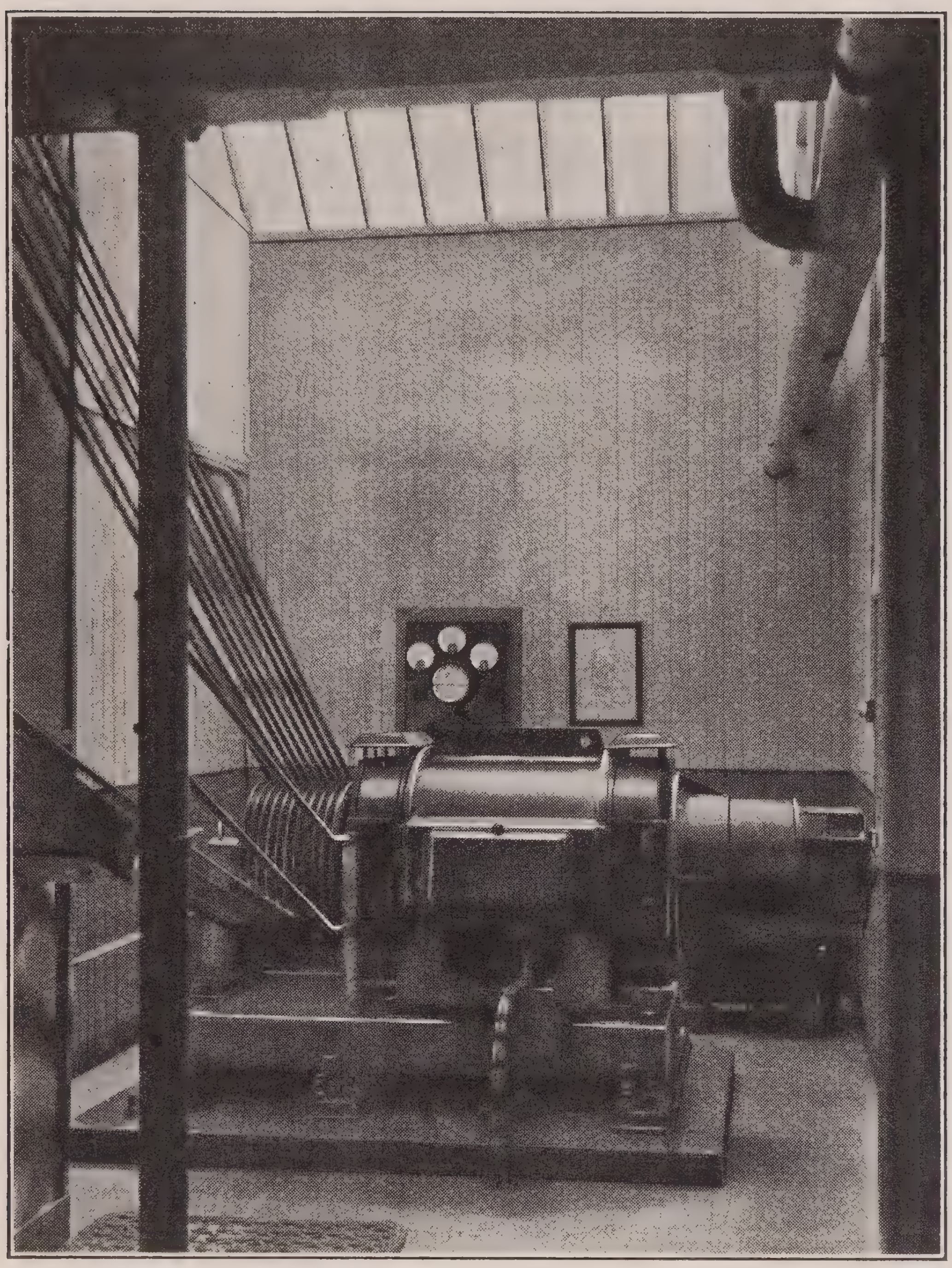
With a view to assisting the Society's general activities, especially during their own campaign, the gas industry also offered to place at the disposal of the Society a smoke abatement exhibit it was prepared to have designed and executed. Because it was known that again there was no desire to introduce into the exhibit anything but the Society's independent and impartial propaganda, it was possible to accept this offer. The Society was, as a matter of fact, urgently requiring new exhibition material of a higher standard than that which it has been using, but, as usual, the expense was greater than could be borne out of normal income.

Subject to the final approval of the Society, the nature of the actual exhibits and the technical matters involved in construction were placed in the hands of Mr. Misha Black, who is recognised as the leading exhibition designer in the country. And Mr. Black may be given the warmest congratulations upon the magnificent results he has achieved. The exhibit was given its first showing at the Building Exhibition at Olympia, as shown in the photograph on page 101, but the most important exhibition will be at the special exhibitions section of the Charing Cross Underground Station, which is to be opened on Monday, 28th November, by Mr. Herbert Morrison, M.P. It is hoped that as many members as possible will find an opportunity of visiting it and seeing for themselves how vividly smoke abatement can be " put over." There will be more material and a somewhat more effective presentation at Charing Cross than was possible in the limited space at the Building Exhibition.

The most arresting feature of the exhibit is a diorama of a smoky, gloomy city, which, as the observer watches is almost imperceptibly transformed into a clean white city bathed in vivid sunlight. " We CAN work this Miracle " is the fitting slogan that accompanies it. At Olympia this appeared to attract more attention than any other exhibit in the building, and there was often a queue of people waiting their turn to see it. The other sections which bring in movement and changing lights, illustrate points in the smoke abatement case in ways that—as observations showed—simply compel interest and attention.

Olympia was a kind of rehearsal for Charing Cross, of which a full report will be given in the next issue. It may be of interest to mention that the inquiries made by visitors at Olympia revealed a healthy (from the Society's viewpoint) demand for information about smokeless methods of *every* kind.

SMOKELESS POWER



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What the Gas Campaign Means.

Those concerned with the different smokeless mediums—electricity, gas, natural smokeless coals, coke, semi-coke, and oil—and the manufacturers of appliances for reducing or preventing smoke from bituminous coal, have all at times stressed smokelessness and its related characteristics, such as cleanliness, as one of the features of their products. But before now this has not been developed into the primary appeal, although on occasion the Society has suggested that it would be of value to the movement in general if smoke abatement could be brought more definitely to the fore by those who can provide the means for accomplishing it.

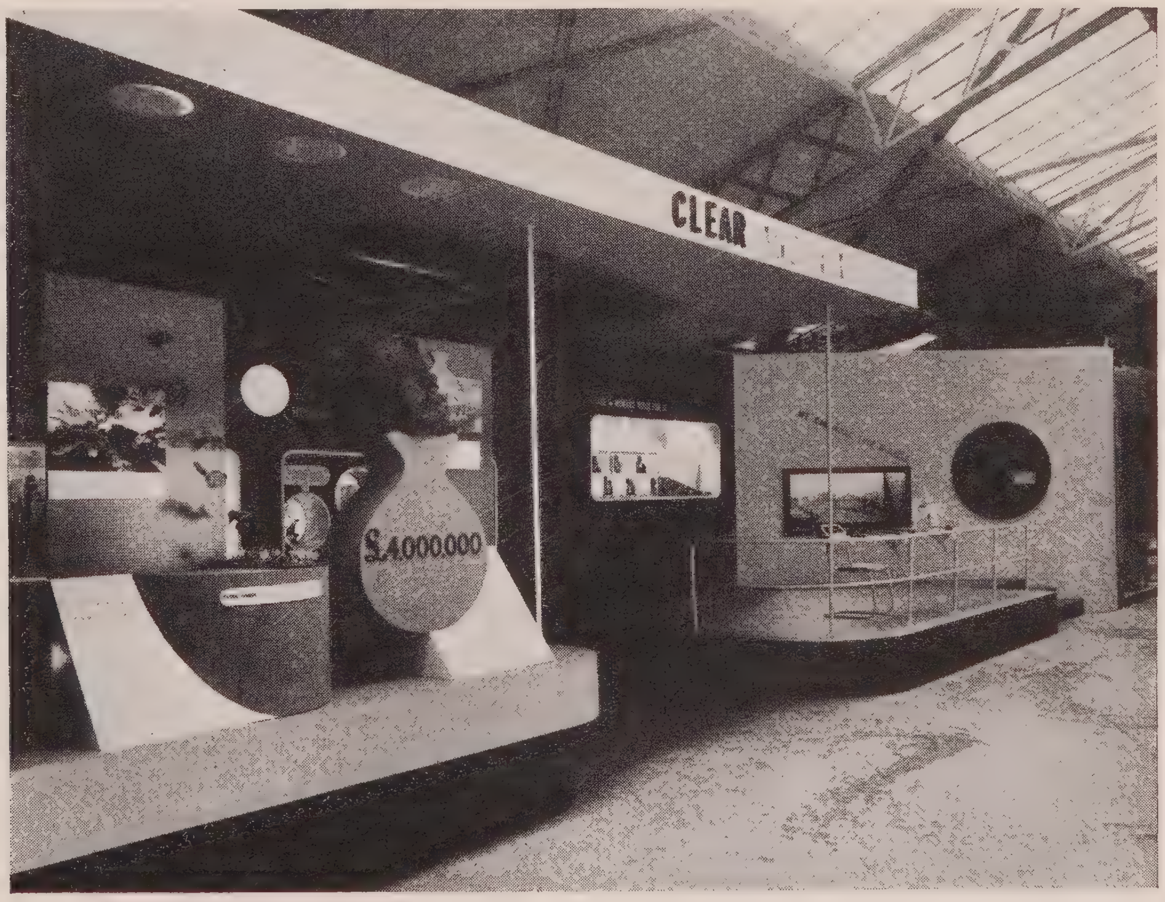
This development appears at last to be starting, and a tribute is due to the gas industry for having so energetically taken the initiative. We hope that with them it will not be merely the slogan of a season, and we hope even more earnestly that our other friends will each consider the ways in which they too can advance the idea of smoke abatement. The Society will willingly co-operate in any way that is consistent with its impartiality and independence—that is, on the purely smoke abatement side.

The fact that the present gas campaign and the others which may be envisaged, are embarked upon for straightforward commercial purposes, does not in any way detract from their value to the smoke abatement movement. The solution of the smoke problem is inevitably dependent upon the progress of *all* the smokeless mediums and appliances, and everything that helps to create the right public opinion benefits all. The gas campaign is, of course, primarily for the benefit of the gas industry, but at the same time it is benefiting the smoke abatement movement and that is in its turn is benefiting those interested in the other smokeless methods.

In ways that do not concern us there may be competition between the different methods, but in our particular work there is no need to think of competition; the field is big enough for all. At present, indeed, it is too big. Co-operation with respect to smoke abatement is obviously desirable. Collective action to hammer home to the public the facts about smoke will help one and all.

The inference is clear. The Society is the hammer. For years it has been quietly tapping, but it has never had enough force to give the necessary hard and continuous blows. Cannot the gas campaign be regarded not as something that concerns the gas industry only, but as the beginning of an intense and continuous effort, with the co-operation of all, towards the realization of the Society's objectives?

Now that one industry has recognised the importance of smoke abatement cannot both that one and the others see their way to help the Society to change its patient tap, tap, tap, into real and effective hammer blows?



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THE DEVELOPMENT OF A PROCESS OF FLUE GAS WASHING WITHOUT EFFLUENT

A PAPER BY DR. R. LESSING

ON THE FULHAM POWER STATION PLANT

In his chairman's address to the London Section of the Society of Chemical Industry on 3rd October, 1938 Dr. R. Lessing (who is a member of the Executive Committee of the National Smoke Abatement Society) described the development of the highly effective process devised for and in operation at the new Fulham Power Station. Dr. Lessing's paper is unfortunately too long to permit its reproduction in full in these columns, but passages of the most general interest have been abstracted or condensed from it as follows.

" The concentration of power production in large units," the paper begins, " brought in its train the problem of avoiding excessive atmospheric pollution which although it had always been a concomitant of all modes of burning fuel, required special attention in connection with the design of large power stations, in view of the vast scale on which combustion was carried out in one spot. The emission of dust and grit became obvious to an increasing degree from the moment when coal of slack size began to be burned for industrial purposes on mechanical grates in place of the old-time hand-fired round coal, and dust emission became further accentuated when pulverized fuel made its appearance. The emission of sulphur oxides liberated in the burning of coal or oil did not receive any attention except in isolated cases until the London Power Company contemplated building a large power station at Battersea.

" A judgment of the House of Lords in 1929 sustaining the claim of the aggrieved owner of land damaged by sulphur gases from the Barton Electricity works of the Manchester Corporation, gave the signal for a popular outcry in the form of a press campaign against the erection of large power stations in the heart of London. The Electricity Commissioners considered it therfeore expedient to hold a Public Inquiry in December, 1930, before consenting to the erection at Fulham of a further power station of approximately the same capacity as, and within about 2 miles from, Battersea.

" As a result of this inquiry the Commissioners attached to their consent a condition that in the operation of the station, the most efficient methods should be continuously used which might for the time being be reasonably practicable for the elimination of smoke and grit and for the prevention of the discharge of sulphur and its compounds into the atmosphere. The Commissioners did not see their way to prescribe the precise degree of efficiency which must be attained at any time by the sulphur elimination plant. The Local Authorities opposing the erection of a power station at Fulham had pressed for an upper limit of 0.02 grain of sulphur per cubic foot of chimney gases, but it was at that time considered very doubtful whether such a limit could be attained in commercial routine operation. At a later stage it became apparent that a maximum sulphur of 0.03 grain per cubic foot could be safely guaranteed. Anticipating what follows hereafter, it may be stated that the average of the official Government tests for total acidity at Fulham during 1937 was as low as 0.0046 grain per cubic foot of dry gas at N.T.P.

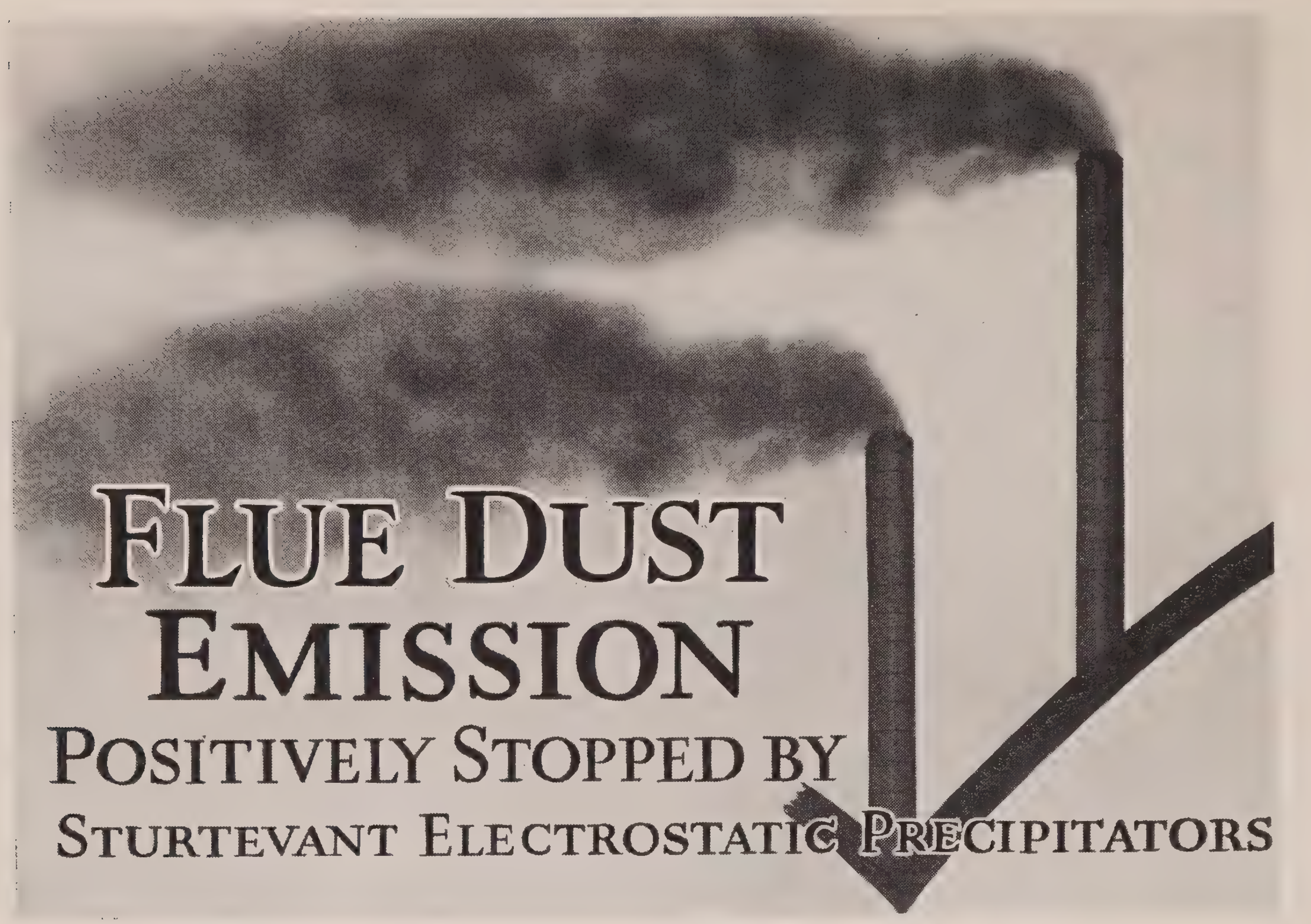
" The necessity for incorporating equipment for the elimination of flue dust and sulphur became apparent in the very early stages of planning the lay-out of the station, quite apart from the stimulus of outside influences. The coal consumption of the complete station was estimated at that time to be rather more than 2,000 tons per day and it had been shown that this would result in the emission of about 30 tons of flue dust and the equivalent of about 100 tons of sulphuric acid per 24 hours. Those responsible for the design of the station realized from the beginning that a pollution of the atmosphere from a point source on the scale indicated by the magnitude of these figures, could never be contemplated and that the installation of plant for eliminating these noxious substances became imperative."

Experimental Plant.

The paper continues by showing that a washing method was required and that any method capable of extracting nearly all the sulphur would, *ipso facto*, remove grit and dust to at least the same degree. Compared with existing systems the scale of the operations —when burning 2,000 tons of coal a day more than 1,000 million cubic feet of gases would be liberated— and the low concentration of sulphur dioxide in the flue gases, created entirely new problems. A Modave washer was installed at the old Fulham Electricity Works for experimental purposes. In this system vertical concave sided tubes are arranged in rows and staggered against each other so that the gases passing horizontally have to follow a tortuous path. The grit deposited on the concave outer sides of the tubes is washed down by water which flows through the interior of the tubes and, in overflowing, forms a film on the outside.

Washing with water could not be considered because of the consequences if so much acidified matter were to be discharged into the Thames. The opposition of the Port of London Authority had been withdrawn only on an agreement that certain conditions with regard to the nature of any effluent would be met.

" A process was worked out which briefly consists in bringing the gases into intimate contact in a washing



FLUE DUST EMISSION

POSITIVELY STOPPED BY STURTEVANT ELECTROSTATIC PRECIPITATORS

Left
Collecting precious metals from flue gases of metallurgical furnaces.

Right
Cleaning flue gases from a rotary dryer in a limestone quarry.

Below
Cleaning flue gases from a cement kiln.

Sturtevant Electrostatic Precipitators find application in many branches of industry, are cheap to operate and maintain, and clean flue gases to the highest degree of efficiency.

Full particulars are given in our publication M1494.

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plant with an aqueous suspension of lime or calcium carbonate, whereby the sulphur oxides react with the calcium compounds, forming calcium sulphite and calcium sulphate. The ration of sulphite to sulphate depends primarily on the proportion of sulphur trioxide and the amount of excess air in the combustion gases. The suspension containing the reaction products, after leaving the washer, is passed through a settling tank in which the mixture of calcium sulphite, calcium sulphate, excess calcium carbonate and flue dust is removed by sedimentation, whilst the clarified liquor consisting now of a saturated solution of calcium sulphate and calcium sulphite is recovered. After adding the appropriate amount of fresh lime or calcium carbonate, the new suspension is returned to the washing plant, thus completing the liquid cycle which is maintained by withdrawing the solid calcium salts in form of a sludge and adding fresh lime and make-up water to replace that lost by evaporation and contained in the sludge.

" Besides avoiding a liquid effluent, cyclic working has the advantage of permitting any desired rate of circulation and therefore of irrigation of the scrubbing elements, whilst in open working the rate of liquid flow is limited by considerations of water supply and effluent discharge.

" The simplicity of the reactions involved in the process justified their application on a scale large enough to furnish reliable information on the chemical, physical, and mechanical factors which would govern the design of the final installation. The Modave washer was considered suitable for these studies and it was therefore equipped with the auxiliary plant needed for cyclic working."

Tests showed that the degree of sulphur removal was dependent upon the rate of gas flow, and when this was recognised extraction efficiencies up to 95% were reached. Using these results as the basis of the preliminary designs for the plant showed that the bulk of the equipment would be excessive and probably larger than the boiler it was intended to serve. Further work on the experimental plant led to the replacement of the tubular elements by contact rings having a total surface of 36 square feet per cubic foot of washer volume, compared with 4.5 square feet of contact surface with the tubes. A considerably higher sulphur extracting efficiency was thereby attained.

The work so far dealt with extended over rather more than 15 months, during which attention was mainly focussed on the gas treatment side and on the conditions under which the desired sulphur elimination could be obtained. Test runs showed that a maximum of 0.02 grains of sulphur per cubic foot of washed flue gas could be attained and could probably be improved with further experience. Problems connected with the composition and the behaviour of the washing liquor had to be investigated simultaneously. Different agents were considered and well over 5,000 analyses made during that time. Conditions had made it possible to run the plant for short and intermittent periods only, but when longer running was begun heavy deposits on the contact surfaces in the washers was encountered. In the first test after 25 hours the plant began to show signs of increasing resistance to the gas flow, and after 72 hours the draught loss made it impossible to maintain the requisite loan on the boiler. It was found that the surfaces were covered with a deposit which in places was an inch thick.

There followed a period of intensive research to probe into the elucidation of the mechanism of scale formation and to devise means for overcoming the difficulty, before it was possible to return to the trial plant and demonstrate a practical method of operation without the risk of an involuntary stoppage.

The paper considers this investigation in detail. It was found that the scaling was due to supersaturation of the washing solution and uncontrolled crystallization of hydrated calcium sulphate from it.

In summary, a simple method was worked out for the preparation of calcium sulphate solutions of definite supersaturation. Supersaturation was not inhibited by the presence in the solution of salts having an ion common to calcium sulphate. Rapid de-supersaturisation could however be brought about by solid hydrated calcium sulphate in suspension. Other solids had little or no effect. The rate of de-supersaturation was found to be a function of the amount of hydrated calcium sulphate present in suspension and scale formation could be prevented by maintaining adequate concentration of this compound for a definite time before permitting further absorption of sulphur oxides. By intermittent flushing of plant surfaces with water the growth of scale on these became negligible when they were irrigated with a washing liquor containing sufficient solid hydrated calcium sulphate but was not entirely avoided in its absence. It was observed that calcium sulphite lowered the efficacy of the hydrated calcium sulphate as a de-supersaturating agent. The conditions for rapid oxidation of calcium sulphite were studied.

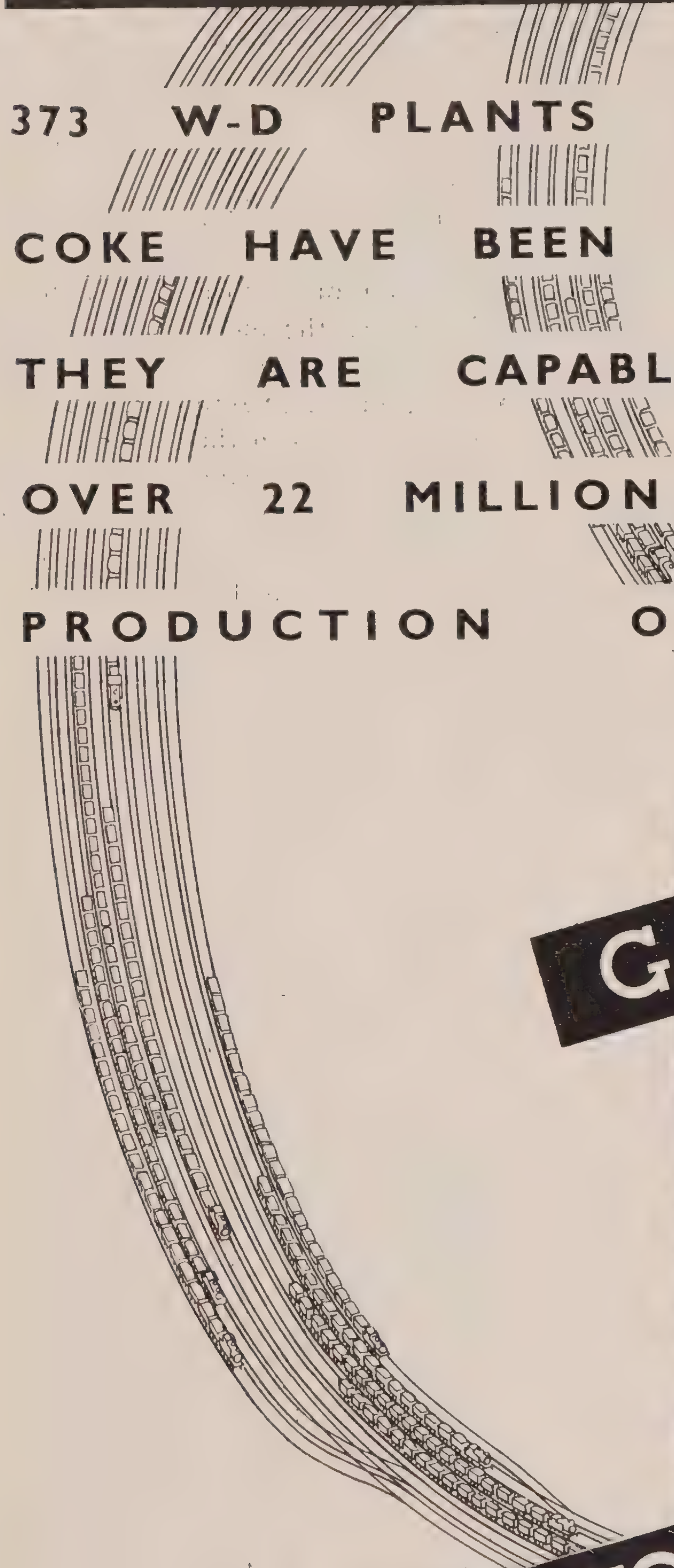
The results of the investigation led to a new process using a washing liquor in which 5% of solid calcium sulphate dihydrate is suspended and which is of " pea-soup " consistency. By keeping the liquor out of contact with the acid gases for half a minute or more before returning it into the cycle, scale prevention is definitely assured. The efficacy of the process was confirmed by extensive runs on the Fulham experimental plant and subsequently on a pilot plant comprising a grid-packed scrubber at the Billingham Works of the I.C.I.

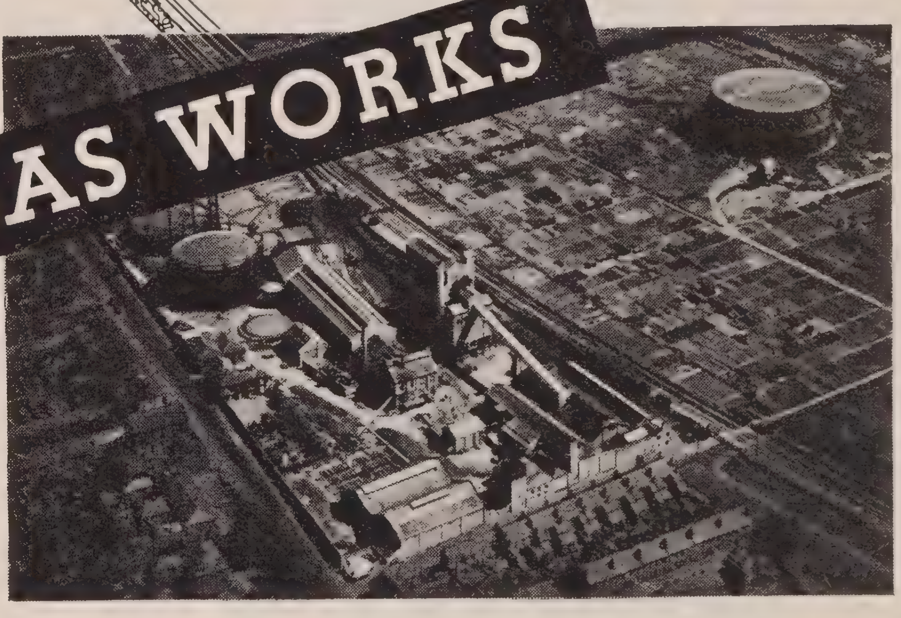
The Plant.

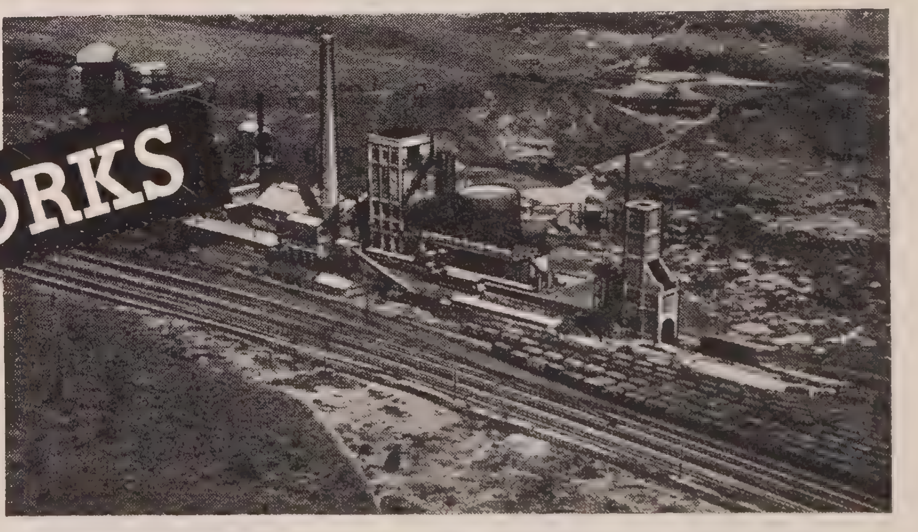
A brief description and drawings of the Fulham plant were published in a brochure issued on the occasion of the opening of the station, and further details are given in a comprehensive paper by W.C. Parker and H. Clarke before the Institution of Civil Engineers (J.Inst.Civil Eng., June, 1938, 17).

OUR IDEAL-A SMOKELESS CITY

373 W-D PLANTS FOR PRODUCING GAS & COKE HAVE BEEN BUILT IN 24 COUNTRIES. THEY ARE CAPABLE OF TREATING YEARLY OVER 22 MILLION TONS OF COAL, FOR PRODUCTION OF SMOKELESS FUEL







W-D

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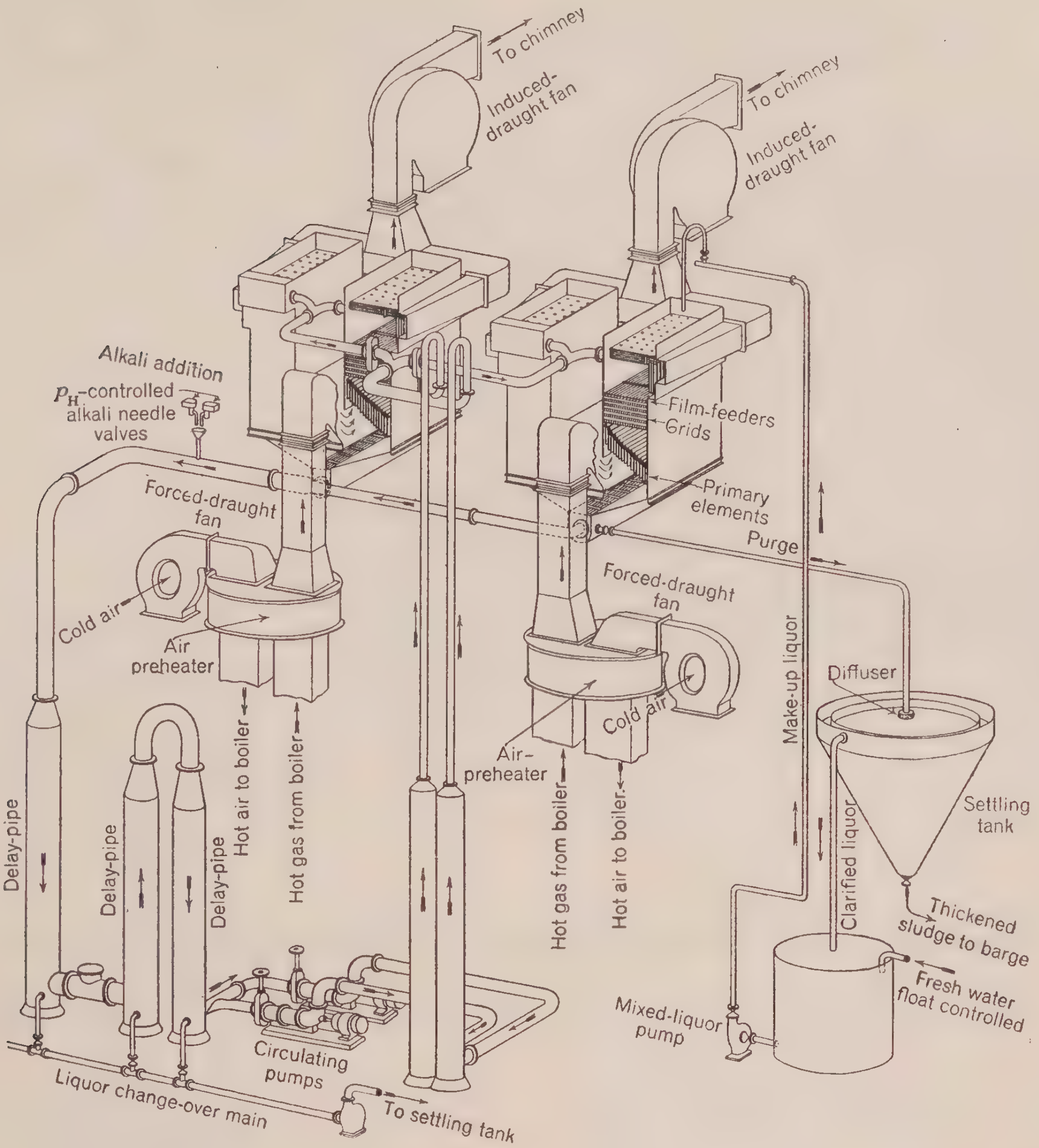

An important feature of the layout is the equipment of each boiler, of which there will be 16 in the complete station, 8 being now installed, with its own washing plant. Each washer is entirely self-contained, with the exception of the settling and lime preparation plants which are common to all.

The isometric diagram reproduced gives a self-explanatory view of the washing equipment connected with a single boiler. The settling cone shown would, however, serve a number of boilers. By the use of a heavy suspension as washing liquor the sedimentation requirements are reduced, so that the 4 settlers now installed will suffice for dealing with the solids discharged from twice the number of washers now at work.

The reason for providing each boiler with its own washing plant lies in the desirability of keeping the velocity of gas and liquor constant within reasonable limits, instead of allowing the combustion gases from a varying number of boilers to be treated together.

Mass Flow Data.

Among the figures given in a mass flow data sheet included in the paper the following may be quoted: For 6 boilers, every 24 hours, 1,728 tons of coal, containing 15.6 tons of sulphur (0.9%), are burned. 1,030 million c. ft. of gas enter the washers (at 240° F.) 444,000 tons of liquor are circulated. 29.3 tons of lime, 35.6 tons of hydrated lime, or 48.0 tons of chalk are required as the neutralising agents. With 100% oxidation of the sulphur 1650 tons of liquor pass to the settling tanks, containing 82.6 tons of calcium sulphate, 10.6 tons of flue dust and other matter. With 50% oxidation, 825 tons of liquor contain 41.3 tons of sulphate and 28.9 tons of sulphite.

"In translating the design and method of operation from the experimental plant to that of the power station," continues the paper, "the capacity of each washer had to be multiplied by 20 and that of the whole installation (for one half of the completed station) by about 150. Considering that the continuity of supply of electric current demands the very highest degree of reliability of all plant units involved, it will be understood that such an enormous step in the application of a novel principle caused a certain amount of anxiety to all concerned. Although all phases of the process had been considered in great detail during the various stages of development and the design of the plant, choice of materials and

“MORAL EFFECT”

Battery of Lancashire Boilers at a Public Institution in Lancashire. All the Hodgkinson Stokers are fitted with Lea Coal Meters.

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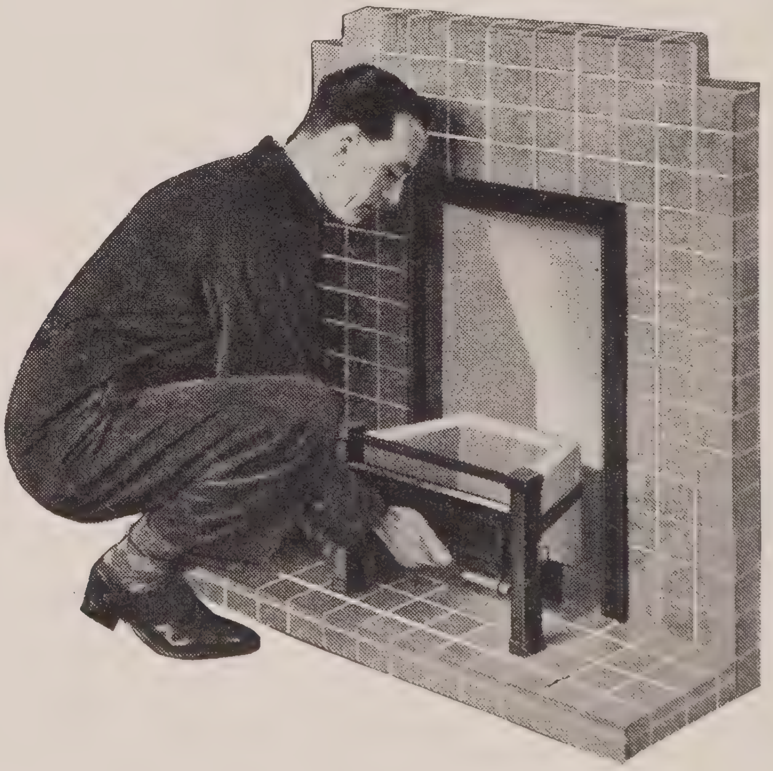

Obtainable from all Gas Companies, Stores and Ironmongers, or write direct to SIDNEY FLAVEL & CO. LTD., Leamington, the Manufacturers and Distributors of the “Metro” Coke Fire for the South Metropolitan Gas Company.

methods of control had been worked out with meticulous care, there still remained a number of unknown factors inherent in the vast difference of scale and not amenable to calculation or definite prediction. It is therefore gratifying that practical work has proceeded very smoothly from the starting up of the plant in September, 1936 without more than the usual " teething " troubles and with results considerably exceeding expectations.

" The Electricity Commissioners in their consent for the erection of the station had stipulated that apparatus for the continuous measurement of sulphur emission should be installed and operated and official records should be kept. According to the 74th Annual Report by the Chief Alkali Inspector the average of 700 Works tests in 1937 gave a total acidity in terms of S of 0.0063 grain per cu. ft. of gas containing 12.5% CO_2 at N.T.P. The average sulphur emission is still less since these figures comprise any hydrochloric acid and nitrogen oxides which have escaped absorption ; the latter account for approximately 20% of the total acidity. As the plant was designed on the supposition that 0.03 grain per cu. ft. was permissible, the actual emission is only one-fifth of that anticipated.

" The sulphur eliminated by gas washing during 1937 when all boilers had not yet come into full operation was 2,371 tons, equivalent to more than 7,000 tons of sulphuric acid. The concentration of flue dust in the chimney emission is so low that the usual methods fail to give reliable results. They indicate that the dust content is smaller than the sulphur content.

" An investigation at various points in the Borough of Fulham, commenced some time before the opening of the power station, proved that its operation had no apparent effect on the local atmospheric pollution."

It is pointed out that the economics of working the plant had to take a secondary place, and in view of lack of experience a wide margin of safety was allowed in the design. Experience has already been gained and technical improvements have suggested themselves. Definite conclusions about cost are therefore premature, and moreover the commercial utilization of the products has not yet been put into practice, although there is no reason why there should not be a source of revenue instead of a charge on the cost.

The Benefits to London.

The paper concludes : " It has been shown (N.S.A.S., Bristol Conference, 1935) that sulphur equivalent to nearly 500,000 tons of sulphuric acid is discharged per annum from the 700 square miles of Greater London. Now that the practicability of extracting almost the whole of the sulphur emitted from boiler installations has been proved, it is interesting to examine the quantitative bearing which this procedure has on the general problem of the pollution of the atmosphere with acids. The washing plants at present installed at the two large power stations, Battersea and Fulham, together have a capacity of extracting sulphur equivalent to 120 tons sulphuric acid per day. When these two stations are completed and working at the appropriate load factor the sulphur extraction will be of the order of 50,000 tons sulphuric acid per annum or about 10% of the total annual sulphur emission over London. It is therefore shown that a very material abatement of acid pollution which automatically carries with it a corresponding reduction in the emission of dust and smoke, can be effected by applying flue gas methods to a relatively small number of point sources at which combustion is carried on on a large scale. The technical, economic and social advantages to be gained by extending the application of these methods are unquestionable."

THE MINISTER OF HEALTH ON SMOKE

MR. HERBERT MORRISON ON LONDON'S PROBLEM

Smoke abatement was the main theme of speeches by Mr. Walter Elliott, Minister of Health, and of Mr. Herbert Morrison, Leader of the London County Council, at a luncheon of the British Commercial Gas Association in London on 18th October.

Mr. Elliott declared that the development of smokeless fuels could make our cities as clean and beautiful as those of ancient Greece. " I would like," he said, " to see Mr. Morrison and his Council in an open-air Greek theatre when the smoke and smuts have cleared away and it is possible for us to indulge not only in the poetry but the clothes of ancient Greece."

He thought that dirt was not only matter in the wrong place but also energy in the wrong place. When he saw literally thousands of horse-power of energy being devoted to burning pit heaps to the actual destruction of amenity and even of vitality, he could not help remembering that it was only about 150 years since the beginning of the industrial revolution and that we were not more fit to be trusted with many of the powers which had been put into our hands, either industrially or economically, than a ten year old child was fit to be trusted with a revolver.

TO ALL USERS OF FUEL IN NEED OF EXPERT ADVICE ON:

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The London and Counties Coke Association gives technical assistance to all users of fuel, to those installing heating or drying plant of any description, to Architects and to Heating Engineers. Its Engineers and Fuel Experts attend personally to advise on installations of plant, to carry out boiler tests and to assist in securing the greatest efficiency. The Technical Department of this Association makes a thorough investigation of the special needs of each individual case, freely and without obligation and gives impartial advice on the plant or the methods to be used.

★ Authoritative Brochures dealing with the subjects above ● have been issued by the Association; these give full descriptions and illustrations of the different types of plant which have been tested and approved by the Association. Copies will be sent free on request.

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THE LONDON & COUNTIES COKE ASSOCIATION

1 GROSVENOR PLACE, LONDON, S.W.1 (SLOane 5136)

"As one concerned with London's government," said Mr. Morrison, "the ill-effects of smoke have been brought home to me. The two principal evils of smoke lie in its damaging effect on health and its depressing effect on the amenities of life. I think you can imagine how heart-breaking it is to those who have planned new clean buildings, who have tried to bring sunlight to homes where before there was gloom, when they see the first smears of smoke dirt on the walls, and know that windows made for the sun will be shut against the poisonous smoke fog."

Mr. Morrison said that local authorities were in a key position to make possible and apply a remedy for the position, but the biggest gap in their powers was the refusal of Parliament to allow domestic smoke production to be controlled. He thought the L.C.C. had been as active as anyone in the cause and as regards the rest of the country there had been a general movement to intensify effort, leading to the formation of several regional advisory committees, and various special proposals, such as the bold proposal for a smokeless area in Manchester. They were glad to greet the new advisory committee for Greater London. Nevertheless smoke abatement was doing little more than mark time.

Bone to Pick with the Minister.

Mr. Morrison said that local authorities would do more if they knew their schemes were part of a general national effort. "I see the Minister of Health sitting here," he continued, "and I have a bone to pick with him. He and his predecessors, including our present Prime Minister, have sometimes raised our hopes high by their trenchant remarks on the evils of smoke and the words of encouragement they have spoken to those who are fighting against it. But we are sad; we are discouraged; we are on the verge of disillusionment. For we have not found that buzz of activity inside the Ministry which such speeches led us to expect. We have not woken up one morning to find that a great constructive scheme towards smoke abatement on a national scale has been put forward by the Ministry. We do not find local authorities in the backwoods complaining that the Ministry is moving too fast for them. In fact, the Ministry prefers to lead its smoke abatement regiments from behind—it finds it less exciting."

Mr. Morrison referred to the smoky chimneys of Whitehall, and contrasted them with the County Hall, where smokeless solid fuel was used for central heating and air conditioning plant and in open fireplaces.

"Well now, what extra effort can local authorities make in the future (I am going to assume that after this luncheon they will be vigorously supported by the Ministry). They can, of course, tighten up the administration of their statutory powers. But, as landlords they have a duty and an opportunity which may be even more important. They can experiment in their own estates and they can give a lead in positive steps, not to minimize domestic smoke, but to stop it being produced at all.

L.C.C. Investigations.

"Take London, for instance, whose Council is responsible for the building of nearly 100,000 houses, in which over a third of a million people live. Many of the County Council's estates, even some of the most modern, have a fuel system which is smoke producing. Well, the Ministry will hold this against me; but I think you will believe me when I say that I am the last person to suggest that this is a satisfactory position, and that we do not accept it as a permanency. It persists only because doubts still persist of the practical possibilities of remedy on a large scale. But doubts are not certainties, and we have taken it upon ourselves to try to dissolve those doubts by practical experiment. The Council's Housing Committee has been conducting various tests of smokeless fuel systems in normal domestic use. We are checking costs and the comfort of the consumer, and we must be assured that adequate supplies are available.

"It is too early yet to announce a verdict. I can only tell you that the Council has an open mind, and is itself only anxious that the verdict will open up a real possibility of progress in the fight against smoke. You may take it that within the limits of its powers the L.C.C. is carefully examining the whole possibility of transforming London into a smokeless city, at least so far as concerns domestic smoke, which constitutes the greater part of the problem. If the smokeless fuel industry through its various branches can satisfy us that practical alternatives to the combustion of raw coal exist, we shall not be slow to act.

Appeal for Co-operation of All.

Sir David Milne-Watson, replying to the toast proposed by Mr. Walter Elliott, said that the gas industry had welcomed the National Smoke Abatement Society's decision to make a more determined attack on the smoke menace.

"We have laid our own plans for an effort on an unprecedented scale to induce householders, who are unwittingly the chief contributors to this menace, to adopt methods of warming their homes which will no longer foul our air and darken our skies.

"I hope that all other industries concerned with fuel supply," continued Sir David, "will lend their aid and add their voices to this cause. Let the householder choose his own heating method; but, let us all co-operate to ensure that he chooses a method that does not make smoke.

"I hope and expect that the commonsense British people will respond to a double argument based on national well-being and personal self-interest and that they will take action to rid themselves and the community of one of our most persistent national evils."

RATIONAL PLANNING calls for ELECTRICITY

Smokeless power, fumeless heat, flameless light. Cleaner cities, healthier cities, happier people. The day is coming when we shall see all industrial and domestic labour transformed by electrical means.

Announcement of the British Electrical Development Association, Inc., 2 Savoy Hill, London, W.C. 2. *Telephone: Temple Bar 9434.*

REGIONAL COMMITTEE NEWS

On this occasion there is little news to report from the Regional Committees, although it is known that every committee is actively working in one way or another. A meeting of the Manchester and District Committee for the purpose of approving the formation of the proposed Joint Board for the area had to be postponed because of the international crisis at the end of September, although it has now been held, as reported below. Similarly, the first meeting of the newly formed Committee for Bristol and District on 28th September, had to be adjourned because of delegates being unable to attend owing to A.R.P. and similar work. A committee of the new Greater London Advisory Council for Smoke Abatement is being set up for the purpose of drafting a constitution, etc., for the Council, and will in due course place a draft before a full meeting of the Council.

In Newcastle a class for the Smoke Inspector's Certificate, based on the syllabus issued by the Royal Sanitary Institute, is being set up and will be held at the Rutherford Technical College with a membership of 15.

West Lancashire and Cheshire

A meeting of the West Lancashire and Cheshire Regional Smoke Abatement Committee was held in a room at the Brighter Homes Exhibition, Renshaw Hall, Renshaw Street, Liverpool on September 14th last.

The Brighter Homes Exhibition is held annually in Liverpool and on this occasion the opportunity was taken by the West Lancashire and Cheshire Regional Smoke Abatement Committee in conjunction with the Public Health Department of the Liverpool Corporation to engage a stand for the purpose of smoke abatement propaganda.

At the opening ceremony Dr. B. T. J. Glover, Senior Assistant Medical Officer of Health (Liverpool) spoke of the ravages caused by smoke and made a plea for the fuller co-operation by all sections of the community to further the abatement of this unnecessary evil.

Among the exhibits displayed were pieces of masonry showing the damage and dirt caused by smoke ; large scale coloured drawings illustrating the effects of smoke on vegetation and a number of photographs of smoke obscured districts. Various types of apparatus used in the measuring of atmospheric pollution were accompanied by graphs and illustrations of the results obtained. Working models of a factory chimney demonstrating the use of the photo-electric cell smoke detector and one of a Lancashire Boiler were so arranged that they could be operated by the public. An Owens Automatic Air Filter, registering the pollution of the external air in the vicinity of the exhibition hall was also on view.

During the period of the exhibition—September 9th to 24th—the estimated attendance was 80,000. The smoke abatement stand was well attended and in addition to the wide distribution of pamphlets dealing with smoke abatement, Liverpool Corporation Smoke Inspectors were in constant attendance and able to give helpful advice to enquirers.

The Committee is indebted to the following for the loan of apparatus, photographs, etc. : The National Smoke Abatement Society, Department of Scientific and Industrial Research, Royal Institute of British Architects, General Electric Company, Liverpool City Museum and the Liverpool University School of Hygiene.

Manchester and District.

An important step forward towards the establishment of a Statutory Joint Smoke Abatement Board for South-East Lancashire has been made recently.

At a meeting held in April this year, representatives of thirteen local authorities agreed to the formation of a Joint Board, and that the necessary steps be taken, but before doing so it was arranged that all the other authorities in the area should be asked to bring the matter before their councils with a view to joining the board, after which a further conference of all the authorities would be convened.

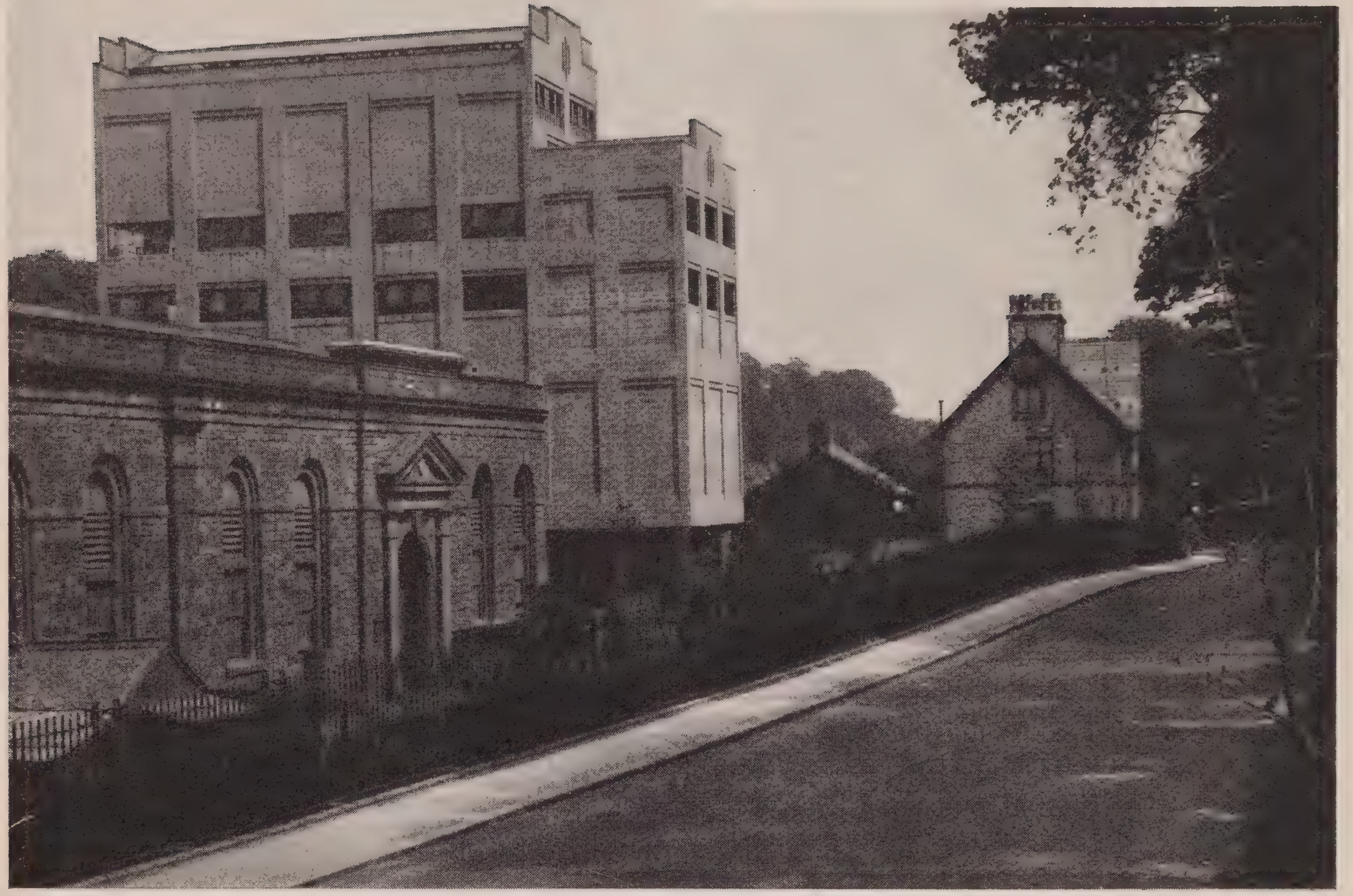
This conference took place in the Town Hall, Manchester, on Tuesday the 25th October and was attended by about one hundred delegates representing 48 authorities within the Regional Area. The Lord Mayor of Manchester (Alderman Sir William Kay), welcomed the delegates and emphasized the great need for the proposed Statutory Board and commended the efforts of the Committee in that direction.

Alderman W. T. Jackson, M.A., J.P., the Chairman of the Regional Committee, who presided at the conference, stated that already about twenty authorities had agreed to join the proposed Joint Board, and he invited the representatives present to use their utmost endeavours to persuade their authorities to join. In any case those authorities who had already agreed would proceed with the scheme. A very interesting discussion took place, at the conclusion of which the following resolution was passed almost unanimously :—

> " That the Committee referred to in the resolution passed at the conference held on April 12th, 1938, which was to consist of one representative of each of the authorities approving the proposal to form a Joint Smoke Abatement Board, be instructed to take steps for the preparation of a draft Order constituting a united district (to be governed by a Joint Board) consisting of the areas of those authorities which agree to the proposal to form such a Board."

From the foregoing it will be seen that the establishment of the Statutory Board, which has been the main object of the Committee for some years, is now assuming more definite shape, and it is expected that in due course this will be actually accomplished.

(*continued on page* 117).



HEALTH RESORT

AT BUXTON, as at all resorts similarly given over to the promotion of good health, purity of atmosphere amounts to stock-in-trade. In the choice of modernized gas works equipment a very big factor was the necessity for smoke-free operation. And, as at many other health centres, the chosen carbonizing plant was an installation of

totally-enclosed **GLOVER-WEST VERTICAL RETORTS**

"The healthiest fuels produced in the healthiest conditions."

WEST'S GAS IMPROVEMENT CO., LTD. MILES PLATTING, MANCHESTER, 10

THE NORTH-WESTERN BRANCH

The North-Western Branch of the Society, previously the Manchester and District Branch, is now firmly established and continuously active. It has, for the first time, issued a printed Annual Report, which is both a record of successful work and interesting propaganda material. An unusually stimulating feature of the report is a foreword written by Walter Greenwood, the author of " Love on the Dole." This is worth quoting in full :

" It is difficult to use temperate language when dealing with such a subject as smoke abatement. That the National Smoke Abatement Society should have been called into being reveals our indolence and indifference towards a problem which ought long ago to have been tackled.

" It is one of those unaccountable contradictions that the county most notable for individual cleanliness should have the dirtiest towns. Where is there more houseproud a woman, more a slave to scrubbing and scouring than a Lancashire housewife ? And yet, so far as I am aware, one does not hear a word of organized complaint from them.

" This is understandable in a way. Having been born in an atmosphere of soot and grime one grows up to accept it as inevitable. This, it would seem, ought to be the Society's first task, the awakening of the common man and woman to the fact that a perpetual fog of soot and grime is not natural, that it is a legacy of the nineteenth century and quite out of place in this day and age.

" When I first left Salford after a thirty years' residence there to live on the edge of a Surrey wood I found that, for nearly twelve months, I could not concentrate on work. I came to know that if once I looked out of the window I was undone. I simply *had* to clear off outside, to saunter off into the woods to stare at leaves unmarred by soot, to find a never-failing source of pleasure in the enjoyment of what was to me a perpetual atmosphere of holiday. Living as I do now in a cottage by a Cornish cove with the sea splashing spray into the garden, only throws into its real and horrible perspective the recollections of yesterday. The never-failing wonderment which is mine whenever I look out at the cliffs, the sea and the hills beyond is only equalled by the incredulity which also is mine when I return to Salford and Manchester and see the same dreadful spectacle which has stood unchanged for more than a century.

" Individual protest in this matter, as in everything else, is futile. It is the duty of every citizen with any pretensions to social conscience, to assist the National Smoke Abatement Society in their essential work."

Mr. Charles Gandy, who is Chairman of the Branch *pro tem* contributes an introduction which surveys the present position of the movement and shows the real progress that is being made in many directions.

The various activities of the Branch, for the year ended June, 1938, which are recorded have been reported during the year in these columns. The most important, of course, was the deputation to the Manchester Public Health Committee to make proposals for the establishment of a smokeless central area in Manchester.

The accounts of the Branch are included in the report and show a healthy increase in subscriptions over previous years, but the income is obviously quite inadequate for anything like the work that is waiting to be done.

Copies of the report may be obtained from the Hon. Secretaries, at 65, Barton Arcade, Manchester 2.

Regional News—Continued from page 115

Midlands Joint Advisory Council.

Dr. W. R. Martine (Birmingham), Hon. Secretary reports that the course for Smoke Inspectors arranged last year at the request of the Council is to be continued this winter at the Birmingham Central Technical College. At the June examination of the Royal Sanitary Institute, held in Birmingham, six members of last winter's class presented themselves and all gained the Smoke Inspector's Certificate.

Mr. G. W. Farquharson (Senior Smoke Inspector, Birmingham) reports that during the past year a large industrial firm in the area has converted several metallurgical furnaces from oil to coal fired installations with mechanical stokers of the underfeed type, and from observations it would appear that adoption of this method would be a big factor in reduction of the heavy smoke emissions usually associated with such furnaces.

The 12th Annual Report of the Birmingham Branch of the British Empire Cancer Campaign gives points of interest regarding the incidence and treatment of the disease and announces that investigations are being carried out concerning relationship between Armospheric Pollution and Cancer.

One Hundred Years Ago.

The *Newcastle Journal* reprints the following paragraph from one of its 1838 issues :

" A meeting of landowners, farmers and others of the townships of Heworth, Byker and their vicinities, was held at Mr. Cook's Mulberry Inn, Low Felling, on Tuesday, when it was unanimously agreed to form an association for the protection of property from the injurious effect of the smoke issuing from the chimneys of the different manufactories in the Neighbourhood."

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"CAMPANIA FŒLIX"

SMOKE ABATEMENT PROPOSALS IN 1700

When seeking possible new historical material for the Science Museum Exhibition, the Librarian at the Guildhall Library, London, kindly drew our attention to an old pamphlet, published in 1700, by one who describes himself as "Tim. Nourse, Gent." This is entitled "A Discourse on the Fuel of London" and is a section of a larger work advocating various reforms, under the name of "Campania Fœlix."

Though not of such interest as John Evelyn's famous "Fumifugium : or the Smoake of London Dissipated," nor with that work's richness of language and strength of condemnation, Nourse's pamphlet is full of interest and gives us a vivid picture of the London he knew.

He begins by describing London in eulogistic terms. It is a city "which in many respects may challenge a Parity with, if not the Precedence of every city in *Europe*." Because of the Thames "it is form'd to the Figure of the River like a Semi-circle or Crescent, javelling highest in the midst, where it is also beautified with one of the proudest Temples of Europe, whilst the City gently declining towards the extreams, it appears one of the goodliest Theatres in the Universe." The river itself is magnificent and is "cover'd always with such Ships laden with inestimable Riches from all Quarters of the World," while "upon the Banks of it for many miles upwards and downwards, there are a vast Number of stately Buildings and little Towns, being in a manner nothing but a Continuation of Palaces, or Houses of Pleasure."

The streets and the shops are commended, and the overhanging balconys are not only graceful and ornamented, but "useful also to shelter those who walk under them, from the Inconveniences of the Sun and of the Moon."

The praise continues until it comes to a sudden and unexpected end :—

"There is no City in the World can shew so many Noble *Piazza's*, so large, so beautiful, and so regularly Built ; it does abound with curious Walks ; as that of St. *James* Park, those of the Inns of Court, and others, besides the many Gardens and Entertainments of the River. 'Tis beautified with many noble Structures ; the stupendous Fabrick of St. *Pauls*, the *Royal Exchange*, the Pillar near the *Bridge*, as also the *Bridge* it self, together with *Westminster-Abbey*, and the *Hall* adjoyning, and many other Monuments are of that greatness and Solidity, as will not easily be out-fac'd by Time. The Townhouse, as also the several Halls or Colledges of the several Companies of Merchants and Artificers, are most stately Buildings, and truly no City in the World can shew such Cabarets or Taverns as can *London*: These would pass for Palaces in other Countries, to such a Degree of Pomp and Splendure is Ryot and Drinking arriv'd ; but whether this be to its Commendation or no, I dare not determine.

"And now having said all this in Commendation of *London*, I shall add but one Word more, which in short is this : That of all the Cities perhaps in *Europe*, there is not a more nasty and a more unpleasant Place."

Coal Smoke and Coal Dust.

This gives the author the opportunity of explaining the numerous things he could refer to, but which he does not. No, the nastiness is caused by the heaps of coal dust that lie about everywhere, and by the smoke from the burning of the coal. At times Mr. Nourse refers indiscriminately to smoke and to the fine dust from the coal heaps, and seems to regard the dust as much the same as soot. Here we may quote at some length, for here his pen becomes almost as trenchant as Evelyn's :—

"And such truly is the Corroding Quality of this Smoak, that the hardest Things in Nature, or made by Art, cannot resist it, witness the Bars and Casements of Windows, the Balconeys, with all sorts of Iron-work, which though never so well Oil'd and Polish'd, will in a few Years become Eaten and Mouldring with Rust, and must after a short Time be renewed to become fresh Fuel for this all-devouring Smoak. The Stones themselves run the same Fate, witness St. *Peters* in *Westminster*, the Buildings in the *Strand*, as *Sommerset-House*, the *Savoy*, the *New-Exchange*, *Northumberland House*, with the more Ancient Buildings of *White-Hall*, all of which are eaten away, peel'd and fley'd as I may say to the very Bones by this hellish and subterraneous Flume. The vast number of Coal-dust Carts trotting up and down the Town, perpetually scatter very liberally of their precious cargo in the Streets, which all that walk along may partake of freely and welcome, the Streets receiving the overplus ; by which means they become most intolerable Dirty upon the least showre of Rain, and as much plagu'd with Dust in dry Weather ; From whence it is, that the Complexions of Men and Women too, if they do not wash and daub, are soon tarnish'd and become Sooty.

"'Twere endless to reckon up all the Mischiefs which Houses suffer hereby in their Furniture, their Plate, their Brass and Pewter, their Glass, with whatsoever is Solid and refin'd, all which are Corroded by it. A Bed of fourscore or one Hundred Pounds Price, after a dozen Years or so, must be laid aside as sullied by the Smoak, which in the Country might have been preserv'd fresh, and in its Primitive Lustre for many Ages. All sorts of Hangings, especially Tapestry, are in a few Years totally defil'd by it, losing their Beauty, and stinking richly into the Bargain, as may be seen or

Be a Good Neighbour

by burning

Pa. "... Funny, they've a lovely fire down there but the chimney doesn't smoke."

Ma. "It's not funny at all, it's COALITE."

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smelt, rather in all the Hangings almost of Ordinary Houses : Hence it is that of latter Years they choose rather to make use of Wainscot to line their Walls with, though this too is quickly found to loose its Beauty. All Gildings, Pictures, Utensils ; in a Word, all manner of Furniture whatsoever, though never so great Care be us'd, do suffer extreamly by this Tartanous Smoak, as do also all Private Persons, those especially of better Fashion, in their Apparel ; so that Hats, Linnen, Perriwigs, Wearing-Cloaths, Silks, with all Things of this Nature presently turn Russet, and loose their Gloss and Beauty.

The Glorious Fabrick of St. Paul's.

" Nay so piercing is this smoak, that it works it self betwixt the joints of Bricks, and eats out the Mortar ; so that what was Fresh and Beautiful Twenty or Thirty years ago, now looks Black, Old and Decay'd, as appears in the Buildings about *Hatton-Gardens*, and up and down *Holborn*, *Bloomsbury* and else where. Upon this Account it is, that once in an Age or Two there must be rebuilding, or continual Repairing in a manner the whole City, which must needs mortifie the Inhabitants, with a continual Embarris of Carts, loaden with Brick and Rubbish, and render the City (as we see it do's upon the matter) fit for nothing but Scavengers. And what is more to be lamented than all the rest, the glorious Fabrick of St. *Paul's* now in building, so Stately and Beautiful as it is, will after an Age or Two, look old and discolour'd before 'tis finished, and may suffer perhaps as much damage by the Smoak, as the former Temple did by the Fire. For 'tis impossible but channell'd Pillars with so much Carving, as is about the Cornish and Porches of this Church, should be furr'd and sooty by the Smoak sticking to it, and in a short time be defac'd. Upon which account perhaps it might have been more convenient, that the Outside of this sumptuous Pile had been of a plainer mould.

" By reason likewise of this Smoak it is, that the Air of the City, especially in the Winter time, is rendred very unwholsome : For in case there be no Wind, and especially in Frosty Weather, the City is cover'd with a thick *Brovillard* or Cloud, which the force of the Winter-Sun is not able to scatter, so that the Inhabitants thereby suffer under a dead benumming Cold, being in a manner totally depriv'd of the warmth and comforts of the Day : To remedy which Disaster they are forc'd to make more Fires than ordinary, so that the more Fire the more Smoak ; and the more Smoak the more need of Fire ; when yet to them who are but a Mile out of Town the Air is sharp, clear and healthy, and the Sun most comfortable and reviving."

The Complete Remedy.

To there is about one-third of his essay ; the remaining two-thirds are devoted to expounding the one remedy which will ensure the abolition of this nuisance. That is, to do away entirely with the burning of coal and to use only wood and charcoal.

A vast quantity of wood would be required, and so he considers how this could be obtained. There are, he estimates 40,000 houses in the city and its precincts, with 360,000 chimneys, each one of which would require one good load of wood or charcoal every year. More would be required by manufacturers—" Brewers, Dyers, Hatters, with such like smoaky Occupations." Noblemen's houses would also take a large amount, but fortunately in the summer they and the gentry retire into the country.

The wood available would soon be used, and the author goes on—at length—to estimate that use would have to be made of the heaths and commons within twenty or thirty miles of London. " It may reasonably be computed to be Fifteen or Twenty Thousand Acres, all which at present is not worth Five Shillings an Acre, being stocked only with rascally Sheep and Geese."

Objections Overcome.

It would even pay to devote Arable land to the growing of wood, and everyone, both Nobility and Commoners, would benefit by the crops of wood, and though those who followed the Chase would be handicapped by the enclosure of commons, yet the new plantations would be excellent for the rearing of game.

The coal merchants would object, although their reasons for doing so have changed considerably since then :—

" If we consider the Question with an eye to the Publick, it will be told us by the Coal-Merchants, that in the Fleets where such Provisions are bought, there are a great number of Boys and Seamen bred, who are so useful to us either for War or Traffick ; also, that one Chaldron of Coal will yield as much Heat as four Loads of Wood ; and that were it not for Coal the poorer sort of *London* would perish. Likewise, that the use of Coal is the preservation of Wood, and consequently of Timber, for where great Woods are cut, many thrifty Trees, which in time would prove excellent Timber, are condemn'd to the Fire."

But these arguments receive short shrift—the sailors could better apply themselves to the fishing trade, or ship charcoal, and it would be much safer for London to have wood close at hand in case of war. It could " never fall a prey to Pyrates, or be subject to Naval Attempts."

Coal might be cheap for the poor, but " the Poor in *London* might subsist as well as they do in other Cities of England, by the benefit only of Wood."

He makes a good point by showing that Paris, with a large population and as many poor, uses nothing but wood and charcoal. Our own problem of adequate storage space is considered, and in case of difficulty it is suggested that charcoal can be used.

There may be inconveniences, he confesses, but these are in no way comparable to the advantages :

" For whilst Sea-Coal is burnt in so great a quantity, it is at present, Shop-keepers must expect to have their Wares tarnish'd and sullied, which must needs debase

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The Report on atmospheric pollution issued by the Industrial Research Dept. gives the following figures for days of thick smoke haze for the two cities: LONDON 61%
CARDIFF - 0%

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the Price, let them do the best they can. The Citizens and Gentlemen must have their rich Furniture smutted and casted, and their closer Rooms stinking and smoky. Their Wearing-Apparel likewise must be subject to the same Fate, and every thing must lose its Lustre. The Skins and Complexions, especially of the fairer Sex, will stand in constant need of artificial helps, which in time brings Nature under inconceivable Decays and Deformity. The Buildings, whether publick or private, must run the like Destiny, whilst their Streets are continually dirty and stinking, and the Town it self perpetually plagu'd with Coal-Dust and Rubbish. The Inhabitants must be contented frequently to want the Sun for many Days together, and especially in a Season when its Beams would be most welcome, as also to have their Bodies fill'd with Coughs and Rheums, till they fall under Consumptions. All the innocent Contents which the Mind can take from fair Prospects, whether of Bulldings or of the Country, are lost in these Clouds : All the Beauties and Verdure of Gardens, are blackened by this sooty Air ; all the Roads and Walks near the City being continually subject to black, stinking Dirt or Dust, and from this stinking and smoaky Air it is probably, that young Infants are hardly to be bred up in *London* : For their new-born Bodies, like tender plants, or Blossoms, are soon blasted by the Sulphureous Exhalation."

But, as with other reformers, no notice seems to have been taken of Tim. Nourse, Gent. and the sea coals continued to come down the Thames, while the rascally sheep and geese remained undisturbed on their commons. But for those who like to let their imagination run riot, suppose that Parliament had adopted the proposals, and had even been able to put them into practice. What would London be to-day? Still a mighty city, with all England a forest supplying her fuel? Or a shrunken town sending perhaps one member to the Parliament at Newcastle?

NEWS AND VIEWS

The S.P.A. Manual.

Readers who wish to be well-informed on the considerable amount of smoke abatement work being done in the U.S.A. as well as wishing to obtain useful general information on the subject, cannot do better than to secure a copy of the new addition of the " Manual of Ordinances and Requirements " published by the Smoke Prevention Association of America.

This contains much technical data on the combustion, furnace management, and the measurement of pollution, a model smoke abatement ordinance, a very full tabulation showing the nature, limitations, and general effectiveness of the city ordinances throughout the country (based on the answers to a questionnaire sent out by the Association), the proceedings of the Annual Convention, and other information almost as interesting to us here as to our friends in America.

The papers read at the Convention are mostly of a technical nature and are essentially practical considerations of combustion and fuel problems. There are 18 in all, and they range from coal and anthracite to locomotive smoke problems, soot and fly ash, dust collection, the economic aspects, and legislation. Of particular interest is the report of a questionnaire, of which 100,000 have been distributed in Pittsburgh by the Bureau of Smoke Regulation, on the effects of smoke upon the health of the individual. It is hoped to obtain fuller information of this questionnaire, and the results obtained and to give a more detailed report in the next issue.

Copies of the Manual may be obtained from the Smoke Prevention Association (Frank A. Chambers, Secretary) at City Hall Square Building, Chicago, Ill., at 50 cents. each.

Electrical Progress.

The 18th Annual Report of the Electricity Commissioners for the year 1937-8 (Stationery Office, 3/- net), comments on the growth in the output of electricity and the rising costs of generation due to increases in the cost of coal.

With regard to the output in 1937 as many as 22,905,000,000 units (a growth of 13.3 per cent. on the previous year) were generated by authorized electricity undertakings, of which 21,425,000,000 units, or 93.5 per cent. were generated at " selected stations " for the purposes of the national grid. Upwards of 14,000,000 tons of coal and coke were used in the generation of the public supply, the average number of units generated per ton amounting to 1,571.

The sales of electricity to consumers in 1937 amounted to over 19,057,000,000 units, an increase of 13.4 per cent on the previous year ; the revenue from the sale of electricity in 1937 amounted to over £83,000,000. During 1937-8 the Commissioners sanctioned the borrowing of over £19,700,000 by local authorities, joint boards, and joint electricity undertakings for electricity supply purposes, bringing the total amount sanctioned since 1920 to over £323,000,000.

A Colliery Smoke Case.

An order for Messrs. John Brown and Co. Ltd., to abate, within nine months, a nuisance caused by excessive emission of smoke from two chimneys at the Aldwarke Main Colliery was granted at the Rotherham West Riding Police Court on 3rd October last. The application was made on behalf of the Sheffield, Rotherham and District Smoke Abatement Committee.

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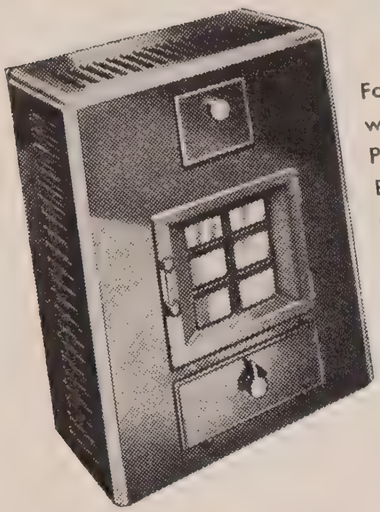

Foreigners haven't a good word for the British winter. Perhaps they are right. But we are an obstinate race and we like it. We admit, however, the need for proper house heating, which, to be really effective, must be *continuous*.

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Whitehall Again !

Much of the pall that veils an August sun, and the chief part of the black fog that will blot out our winter sun, is due to coal fires.

Yet the system of coal firing for heating purposes has not yet been abolished in Government departments. Nor is there any prospect that the day of smokeless fuel is about to dawn—officially.

Modern central heating will be installed throughout the new block of Government buildings to be built in Whitehall, for the Ministry of Labour, Air Ministry, Board of Trade, and Ministry of Transport.

But when the plans were shown to the heads of the departments concerned they all asked for coal fires in their private rooms.—*Evening Standard.*

Rome ban on Welsh Anthracite.

It was reported in *The Times* (12th September) that under a new order of the Italian Coal Monopoly no Welsh anthracite will be imported in future for central heating and other purposes. Commenting on the serious concern in South Wales, one exporter of anthracite remarked that " Italian coal and lignite is smoky, with low thermal value. If lignite is used in Rome it will not be long before the effect is shown on the marble buildings and statues in that city. France tried inferior coals with such sooty deposits and dire results to buildings she rapidly returned to the special coals which South Wales has to offer."

Brick Kiln Smoke.

Following a paper by Mr. E. Roden and Mr. A. T. Green at a meeting of the Ceramic Society at Hanley, there was a discussion which bore to some extent on the problem of smoke abatement.

One member inquired whether the authors could say whether it had definitely been found possible to eliminate the emission of black smoke from kilns producing blue bricks. His experience was that, in the manufacture of Staffordshire blue bricks, although it was possible up to a certain stage in the firing process to keep down the emission of black smoke, there came a period towards the latter part of the firing—in the blueing stage—when black smoke could not be avoided. In the case of his own works, when any secondary air was admitted satisfactory results proved impossible.

Mr. A. T. Green, in reply, said that although it was impossible at the moment to indicate publicly the results of a number of researches which had been undertaken in this respect, he could at least say that certain firms connected with the manufacture both of Staffordshire blue bricks and tiles had put into operation on their kilns arrangements which were showing very considerable success with regard to the reduction of black smoke.

He knew of one case where there had been evolved a system of tertiary air flues, and by this means the smoke was cut down in the blueing period exceptionally quickly. In no sense was he giving it forth that the problem of smoke emission from intermittent kilns had been solved, but he was at least prepared to say that some of the experiments which had been made were definitely indicating several avenues of progress.

Mr. Roden, replying to another questioner, said he knew that in certain cases 50 per cent diminution of smoke emission had been secured ; but it would be too early yet to say whether even these results would conform to local bye-laws.

Central and District Heating.

The article on District Heating, by Mr. A. Margolis, which appeared in the last issue of the *Journal* has been reprinted as a separate paper and copies, price 3d., may be obtained on application.

A publication containing much useful information on district heating and central heating installations, entitled " Engineering and New Homes for Old," by Donald H. V. Smith, has been published. Particulars are given of important blocks of flats in Paris, Lyons, Berlin, Stockholm, Copenhagen and Dundee, etc., with photographic illustrations and details of the heating installations used. More precise information is given of the district heating installations in housing schemes at Dundee, including a financial report, and shows the possibilities of developments of the method on a much larger scale.

It is interesting to note, in the account of the larger district heating scheme in Moscow, that the city is described as completely smokeless and that although it is one of the coldest in Europe it is keeping its inhabitants warm at less cost per head than is being done in any other European country.

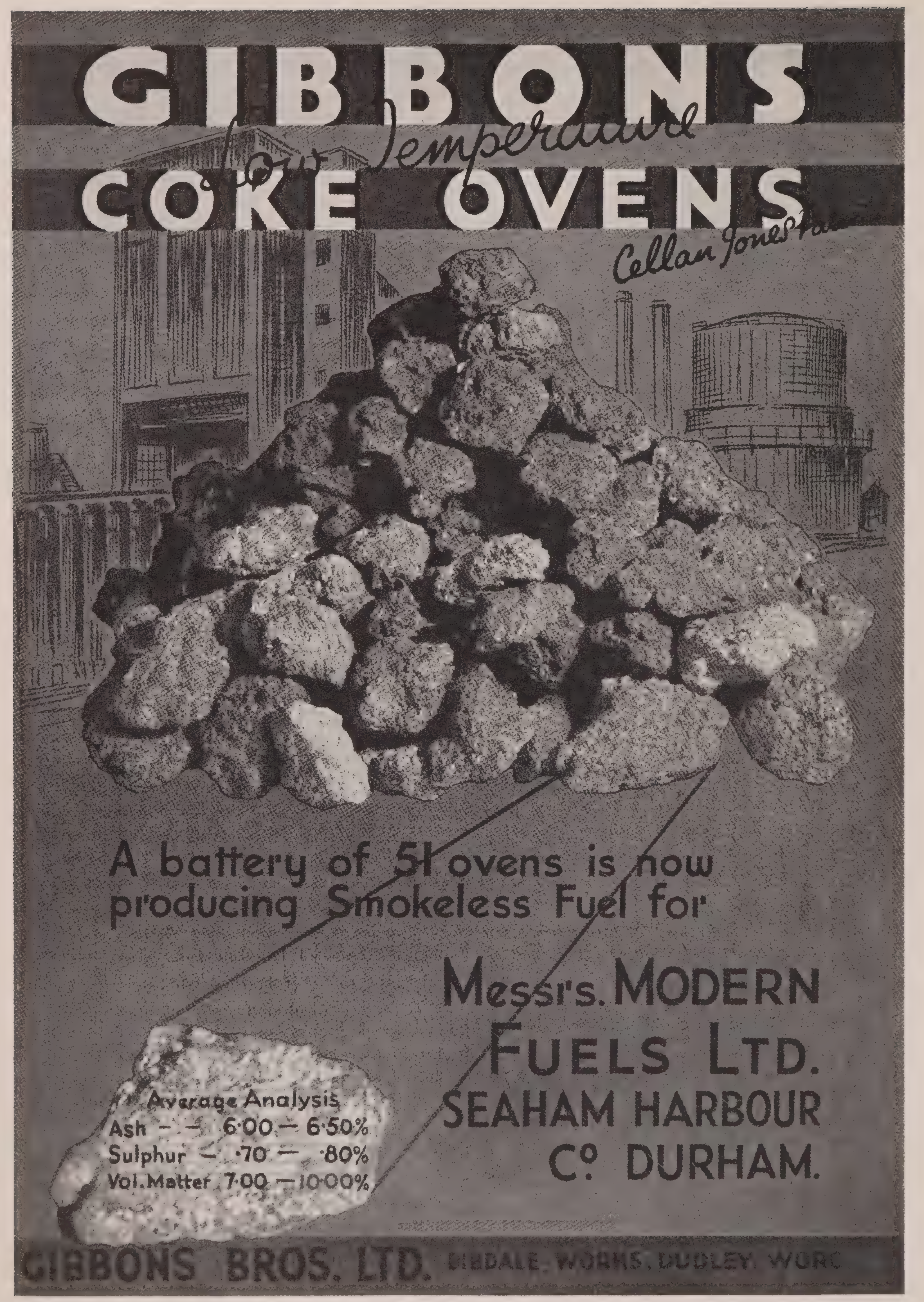
Copies of the booklet may be obtained on request from the Society.

Free-Burning Coke.

Among the papers read at the recent meeting of the Institution of Gas Engineers was one by Mr. James Jamieson, engineer and manager of the City of Edinburgh Gas Department, on the production of free-burning coke in continuous vertical retorts.

Investigations carried out at Edinburgh have shown that it is possible to produce from certain Scottish coals smokeless fuels suitable for the type of open fire normally installed in houses, but not specially designed for fuels less free-burning than bituminous coal.

It was shown that an increase at Edinburgh of from 28/6 per ton for normal coke at 36/- per ton of the new fuel would approximately allow of the production of the gas at the same price per therm. The economic success of the process visualised by the experiments would depend upon the price realizable for the smokeless fuel. If a reasonable increase of price were obtainable, there was no reason why the gas industry should not apply the technique suggested, where suitable coals were available, and contribute still further as a solid fuel industry in the campaign against the production of smoke.

GIBBONS
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" Dr. Bradley Remembers "—A Review.

A book about doctors will always appeal to the layman and Mr. Brett Young's masterly character study of a Black Country general physician adds the dignity of a testament to the literary quality of a fine novel. The general reader will rise from the book with that rare union of devotion and detachment, which is the physician's gift to the world, made warm and living in the person of old Dr. Bradley.

Members of our Society, concerned with one vital aspect of Public Health, will find that Mr. Brett Young has mixed soot and sulphur richly in his ink. His book is not and cannot be mere propaganda. He is writing the life-story of a doctor faced with the industrial environment of the Black Country. It is inevitable that he insists again and again upon the theme of smoke and fog and merciless pollution. This background might have been the literary man's device to obtain local colour. Even from that point of view it has been brilliantly handled, but there is also the accuracy of a devastating report in Mr. Brett Young's description of

" the dusky haze which bleared the feeble lamps on the station platforms with yellowish haloes and adhered to the carriage windows in a mist of fine particles which, when a shower spattered the panes, dissolved into sooty runnels." This " was no miracle of Egyptian darkness but the normal atmosphere of the Black Country, the air which he was destined to breathe for the next fifty years." (*Dr. Bradley Remembers*, by Francis Brett Young, Heinemann, 8/6.).—J. Pickston, b.sc.

The Slow Combustion Stove.

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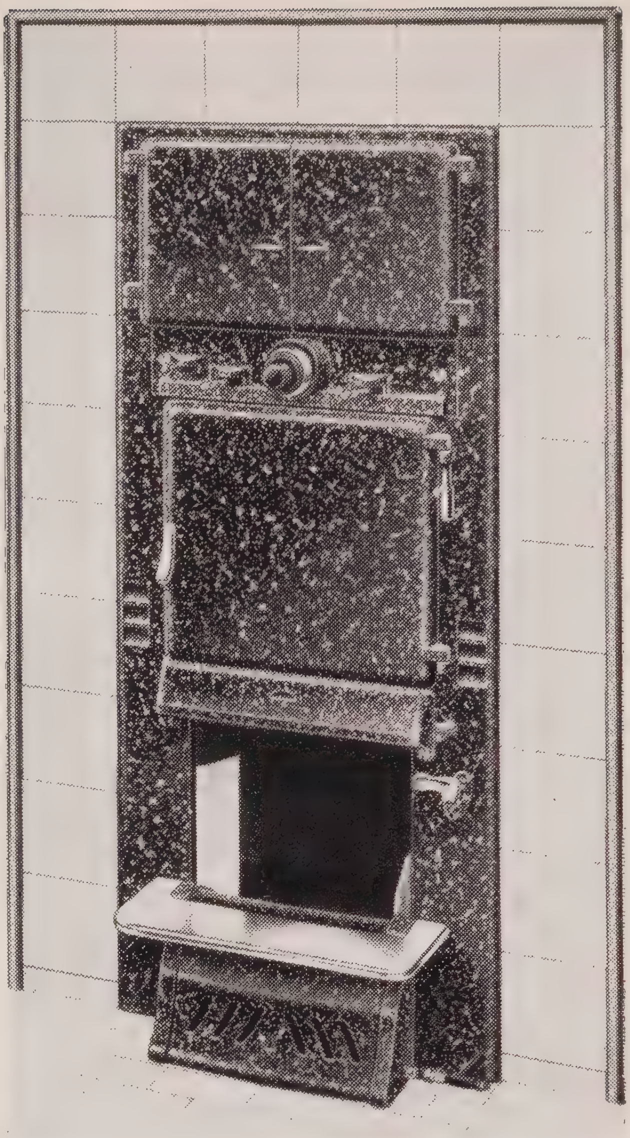

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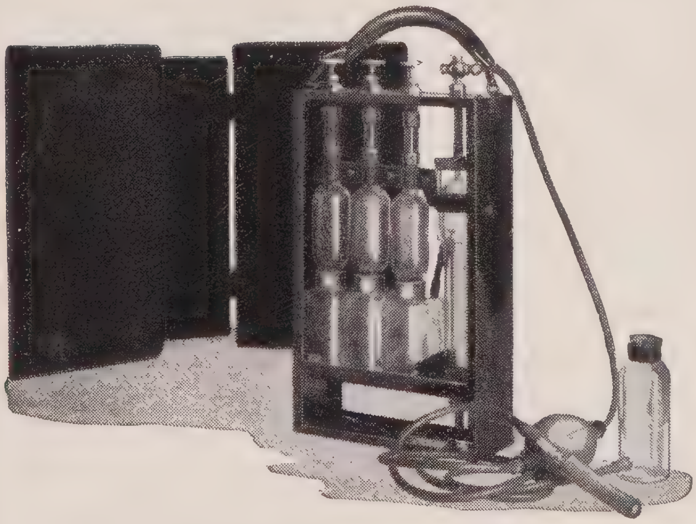

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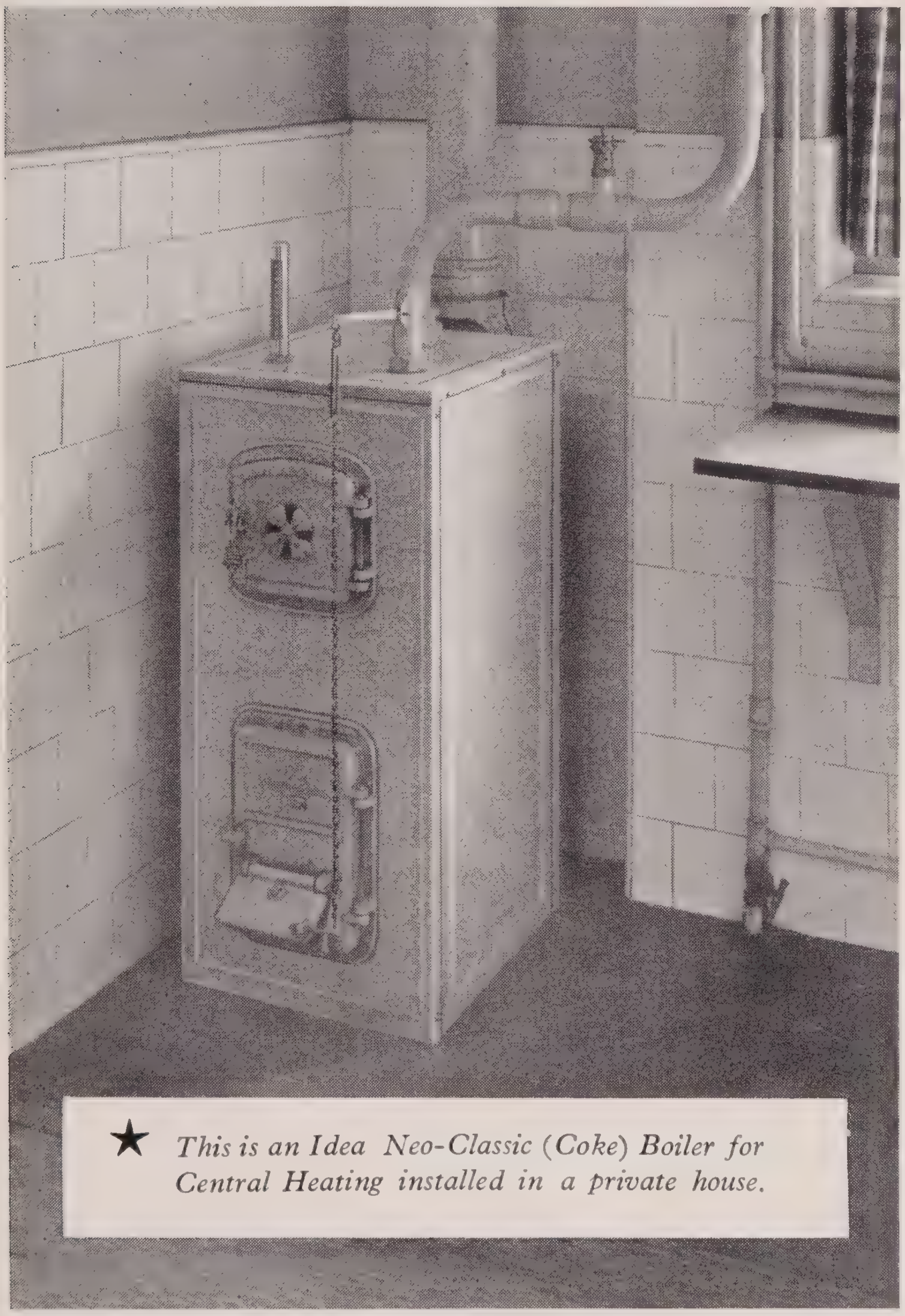

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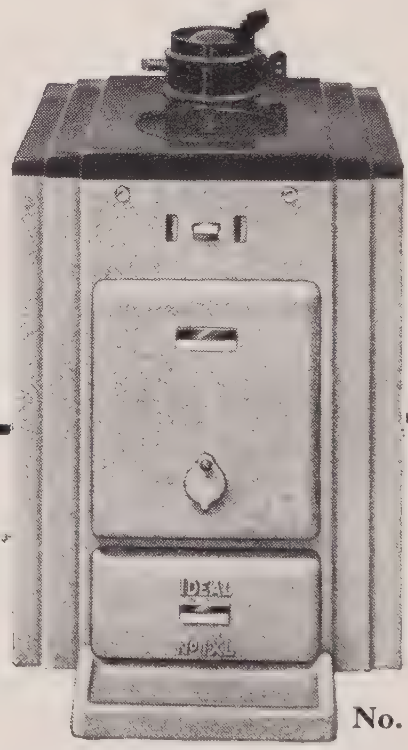

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and printed by J. Bentley & Sons, Albion Works, Todmorden.